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ABSTRACT

This report presents the results of the National Science Foundation's (NSF) Survey of Scientific Activities at Universities and Colleges, 1971, dealing exclusively with the employment of scientific and engineering personnel and the financing of scientific activities in U.S. institutions of higher education. The survey was conducted by mail questionnaires sent to 2,198 universities and colleges that maintained science and engineering programs. Usable questionnaires were received from three-fourths of these institutions. The survey obtained employment figures for scientists and engineers, graduate students receiving stipends for part-time services as scientists, and science technicians, as of mid-January 1971. Current and capital expenditures for research, development, and instruction in the sciences and engineering were collected for academic year 1969-70. The statistics were analyzed by function, level of educational attainment, type of institution, field of science, geographic area, source of funds, cost item and type of research and development, as appropriate. Appendices include related material. (Author/MJM)

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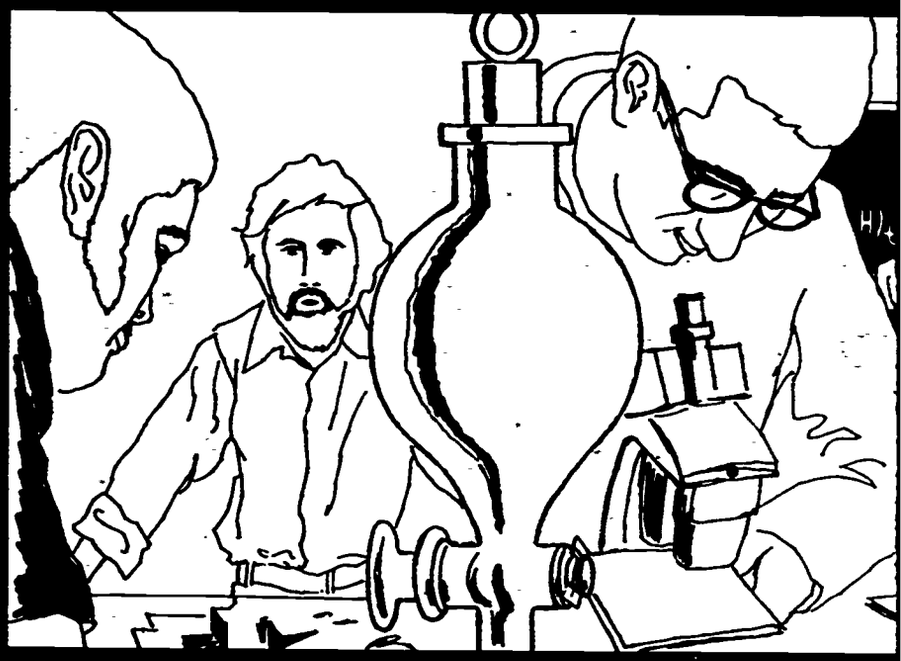

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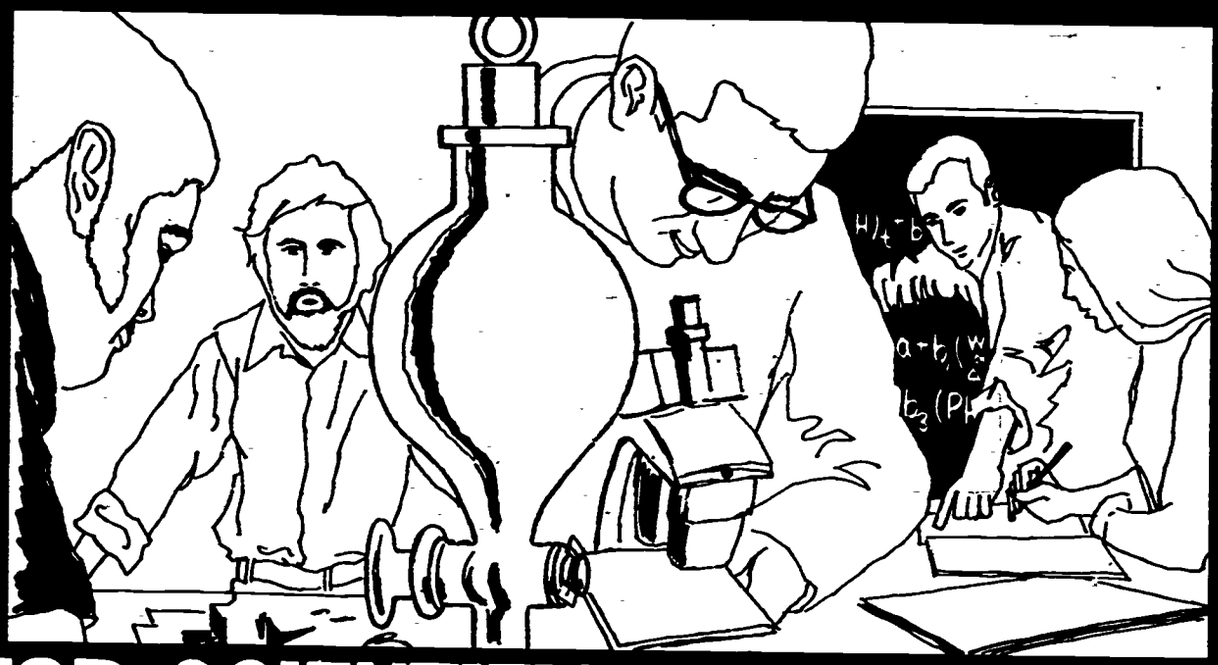

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Title	NSF No.	Price
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(See inside of back cover for Other Science Resources Publications.)

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Resources for Scientific Activities at Universities and Colleges, 1971
Washington, D. C.
National Science Foundation
Report No. 72-315
2 April 1973
Available from GPO Bookstore Stock Number 3800-00133

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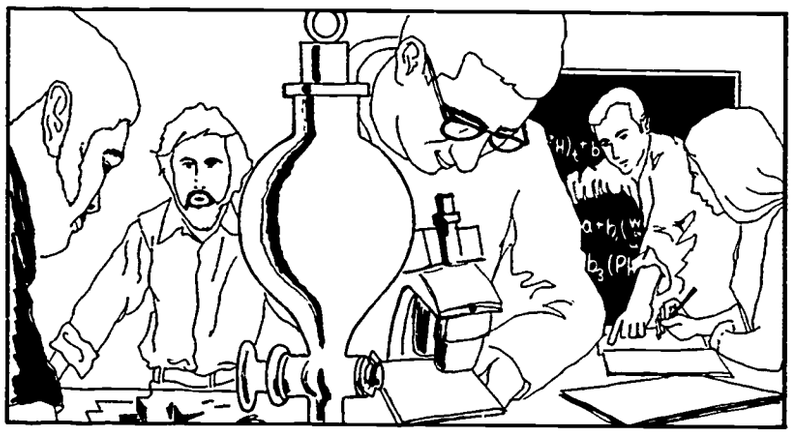

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general notes

- Statistics shown in this report may not add to totals or subtotals because of rounding.
- All percentage changes in trend statistics represent compound annual rates.
- Financial data relate to the academic year, while employment figures relate to January of the designated year. For example, 1970 expenditures represent academic year 1969-70 and 1971 manpower data represent employment levels as of January 1971.
- Data for current R&D expenditures include estimates for departmental research and for other R&D costs for which most universities and colleges do not maintain separate records.

FOREWORD

There has been much in the news of recent years regarding the financial plight in the Nation's universities and colleges. The rapid expansion in academic science programs that occurred throughout the early and mid-sixties established continuing requirements for financing expensive science research and instruction operations. There then followed a period in which academic institutions experienced a leveling off, and in some cases a decline, in support from their traditional sources of revenue, both governmental and private. Although recent increases in the level of Federal and private support are looked upon as hopeful signs of a reversal in this trend, many university administrators and public officials are advocating ways of stabilizing the flow of funds, particularly Federal funds, to institutions of higher education in an attempt to prevent large and unpredictable future fluctuations.

This study is an integral part of the NSF continuing program of periodic surveys designed to produce information on the scope and character of the Nation's investment in science and technology. Under this program all major sectors of the U.S. economy are covered, including industry, government, and independent nonprofit organizations. The present report gives special attention to trends in the utilization of resources by field of science, type of institution, and source of financing.

The National Science Foundation extends its appreciation to the officials of universities and colleges who provided the information upon which this report is based.

H. Guyford Stever
Director
National Science Foundation

September 1972

acknowledgments

This report was prepared in the Division of Science Resources Studies under the guidance of Kenneth Sanow, Head, Statistical Surveys and Reports Section. The survey was conducted under the direction of the late Joseph H. Schuster, Study Director, Universities and Nonprofit Institutions Studies Group. The report was prepared under the direction of William L. Stewart, Acting Study Director. Ronald S. Biggar, Jr., carried out major responsibilities during all phases of the survey and in the preparation of the report. James G. Huckenpahler contributed to all aspects of the survey, including writing certain sections of the report. Joan Staudte provided the statistical assistance required for the survey. Assistance in compiling the mailing list and other aspects of the survey by officials of the U.S. Office of Education is gratefully acknowledged.

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HIGHLIGHTS

- Universities and colleges are experiencing significant shifts in the proportion of scientists and engineers primarily engaged in R&D performance in contrast to those employed as teachers (page 1).

- In full-time-equivalent (FTE) terms, the employment of scientists in research and development declined 1 percent per year between 1969 and 1971 compared with an annual growth of 6 percent from 1965-69 (page 1).

- In contrast, the growth rate of teaching staff remained relatively constant at about 10 percent per year throughout the period; consequently, R&D scientists dropped from 26 percent of total staff in 1965 to 20 percent in 1971 (page 1).

- In FTE terms, graduate student employment increased 3 percent per year from 1969-71 compared with a 10-percent annual growth during 1965-69. The increase of graduate students working on R&D projects fell from an annual rate of 8 percent in the 1965-69 period to 2 percent per year from 1969-71 (page 5).

- Compared with a 9-percent annual growth from 1965 to 1969, the number of technicians employed by universities and colleges actually declined since 1969. The curtailment of technician employment represents an effort by many universities to trim staff and programs for budgetary purposes (page 7).

- Science expenditures in 1970 totaled $7.9 billion; this increase of 6 percent per year (1 percent in constant dollars)[1] over the $7.0 billion total in 1968 compares with a 15-percent annual growth for 1964-68 (page 8).

- Federal financing of research and dev increase per year (a 2-percent annua 1968-70 period. Recent data, howev to universities and colleges will show for fiscal years 1972 and 1973 (page

- Private institutions, more severely a support than public institutions, in percent per year from 1968-70, wh 9-percent annual rate. Both types h least 14 percent in the 1964-68 perio

- Capital expenditures for scientific a ment dropped 5 percent per year du sharp rise (19 percent per year) betw sible for the shift were budgetary red of Federal agencies; however, due t capital expenditures funded from oth a year (page 16).

- For the first time since the inception schools allotted less than one-half t expenditures, reflecting the greater creasing enrollments (page 65).

- Nearly all of the 11,300 scientists a administered FFRDC's in 1971 wor number has remained virtually the sa

- R&D expenditures in university-adm lion, in 1970, six times the $121 m annual percent growth from 1953 however, growth has slowed to 3 pe

[1] Constant dollar data shown throughout this report are based on computations using the GNP implicit price deflator: the data represent estimates of price changes in science and engineering activities rather than precise indicators.

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- Federal financing of research and development leveled off to a 3-percent increase per year (a 2-percent annual decline in constant dollars) in the 1968-70 period. Recent data, however, indicate that Federal obligations to universities and colleges will show a somewhat higher rate of increase for fiscal years 1972 and 1973 (page 10).

- Private institutions, more severely affected by the slowdown in R&D support than public institutions, increased science expenditures by 3 percent per year from 1968-70, while public institutions maintained a 9-percent annual rate. Both types had averaged an annual growth of at least 14 percent in the 1964-68 period (page 12).

- Capital expenditures for scientific and engineering facilities and equipment dropped 5 percent per year during 1968-70, after an extraordinarily sharp rise (19 percent per year) between 1964 and 1968. Largely responsible for the shift were budgetary reductions in facilities-granting programs of Federal agencies; however, due to the tightening economic situation. capital expenditures funded from other sources also declined by 4 percent a year (page 16).

- For the first time since the inception of the current survey series, medical schools allotted less than one-half their science budget to current R&D expenditures, reflecting the greater instructional outlays required by increasing enrollments (page 65).

- Nearly all of the 11,300 scientists and engineers employed in university-administered FFRDC's in 1971 worked full time on R&D projects - this number has remained virtually the same since 1965 (page 19).

- R&D expenditures in university-administered FFRDC's totaled $737 million, in 1970, six times the $121 million reported in 1953. The average annual percent growth from 1953 to 1970 was 11 percent. Since 1964, however, growth has slowed to 3 percent per year (page 21).

INTRODUCTION

This report presents the results of the National Science Foundation's Survey of Scientific Activities at Universities and Colleges, 1971, dealing exclusively with the employment of scientific and engineering personnel and the financing of scientific activities in U.S. institutions of higher education. It is the fourth in a series of biennial surveys instituted in 1964.[1] Earlier surveys, conducted in 1954, 1958, and 1961 were more limited in scope than the current series. The 1954 survey, for example, collected information on the scientific activities of only 190 "large" institutions, while the 1961 survey requested only manpower data.

The survey obtained employment figures for scientists and engineers, graduate students receiving stipends for part-time services as scientists or engineers, and scientific and engineering technicians, as of mid-January 1971, and current and capital expenditures for research, development, and instruction in the sciences and engineering during the academic year 1969-70. Data for universities and colleges are presented in part I of the report, while data relating to university-administered Federally Funded Research and Development Centers (FFRDC's) are presented in part II. The mutual exclusivity of the figures in the two parts should be kept in mind when statistics shown in this report for universities and colleges (part I) are compared with other statistics, such as those published by the U.S. Office of Education, which reflect overall totals for higher education, including university-administered FFRDC's.

Totals for Federal academic science support shown in this report are not directly comparable to those published in the National Science Foundation's annual report to the President and Congress, *Federal Support to Universities, Colleges, and Selected Nonprofit Ins*
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[1] Results of the 1964 survey were published in National Science Foundation, *Scientific Activities at Universities and Colleges, 1964* (NSF 68-22), 1968; those of the 1969 survey in *Resources for Scientific Activities at Universities and Colleges, 1969* (NSF 70-16), 1970 (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office). The results of the 1966 survey were not published separately, but summary figures were included in the report on the 1969 survey.

[2] See related reports on inside cover.

of the National Science Foundation's Universities and Colleges. 1971, dealing scientific and engineering personnel and in U.S. institutions of higher education. nial surveys instituted in 1964.[1] Earlier and 1961 were more limited in scope rvey, for example, collected information 90 "large" institutions, while the 1961 a.

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Colleges, and Selected Nonprofit Institutions[2] because financial figures published here represent actual expenditures of the educational institutions, while those for Federal agencies represent obligations to the institutions. The distinction between *obligations* (i.e., funds allocated by the source) and *expenditures* (i.e., funds actually spent by the performer) in any given year should be kept in mind when figures presented in this report are compared with statistics based upon the obligations of Federal agencies.

The major conceptual difference between this report and the previously published reports in the series is that for the first time nonseparately budgeted R&D expenditures (primarily departmental research) are included in the heading "Current R&D Expenditures" rather than "Current Expenditures for Instruction and Departmental Research." The effect of this change is to augment the R&D expenditure totals by about $320 million in 1964, $370 million in 1966, and $450 million in 1968. It is believed that this shift reflects more accurately the apportionment of current funding emphasis between research and development on the one hand, and instruction on the other.

The manpower figures presented in this report incorporate a refinement in the definition of "scientists and engineers" to exclude physicians primarily engaged in patient care. This adjustment has led to a reduction in the figure for "total scientists and engineers employed" amounting to about 7,000 in January 1965, and about 5,000 in 1967 and 1969.

Details regarding the scope, coverage, methods of estimating and limitations of the survey are presented in the technical notes in appendix A. Also reproduced in the appendixes are the consolidated questionnaires summarizing survey data for selected categories of institutions covered in the survey, as follows: Appendix B, 2,198 universities and colleges, including all medical schools; appendix C, 105 medical schools; and appendix D, 35 university-administered FFRDC's. Survey instructions are reproduced in appendix E.

[2] See related reports on inside cover.

Part I

UNIVERSITIES AND COLLEGES

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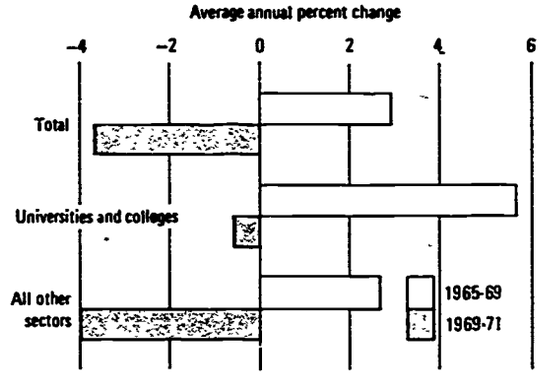
Section 1. SCIENTIFIC AND TECHNICAL PERSONNEL

This section of the report analyzes the principal employment characteristics of scientific personnel engaged in teaching, research, and other scientific and engineering activities in the 2,198 universities and colleges with such programs in January 1971. Excluded from this section and elsewhere in part I are employment and financial characteristics of university-administered FFRDC's, which are shown separately in part II of this report.

Employment statistics reported here are analyzed by employment status, function, disciplinary field, type of institution (highest degree granted in the sciences and engineering), level of educational attainment (highest earned degree of the scientist or engineer), and geographic area. To the extent possible, statistics for 1971 are compared with data for earlier years.[1]

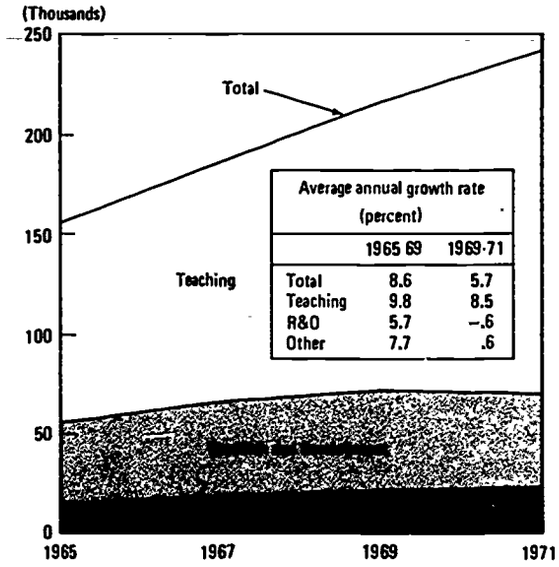
[1] Figures on the employment of scientists and engineers shown in this report for years prior to 1971 represent slight downward revisions (about 3 percent in 1969) from those shown in National Science Foundation, *Resources for Scientific Activities at Universities and Colleges, 1969* (NSF 70-16) (Washington, D.C., 20402, Supt. of Documents, U.S. Government Printing Office, 1971), p.2. The revisions reflect principally the exclusion of M.D.'s and other health-professional personnel primarily engaged in patient care and other clinical activities in university-operated hospitals from scientific employment classifications.

Rates of change in FTE[a] scientists and engineers engaged in research and development in universities and colleges and all other sectors of the economy, 1965-69 and 1969-71



[a]Full-time equivalent
SOURCE: National Science Foundation

FTE[a] scientists and engineers employed in universities and colleges, by function



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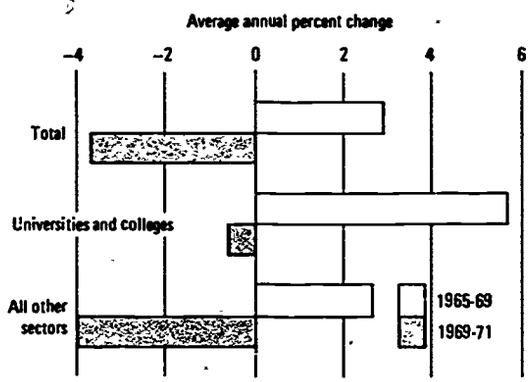
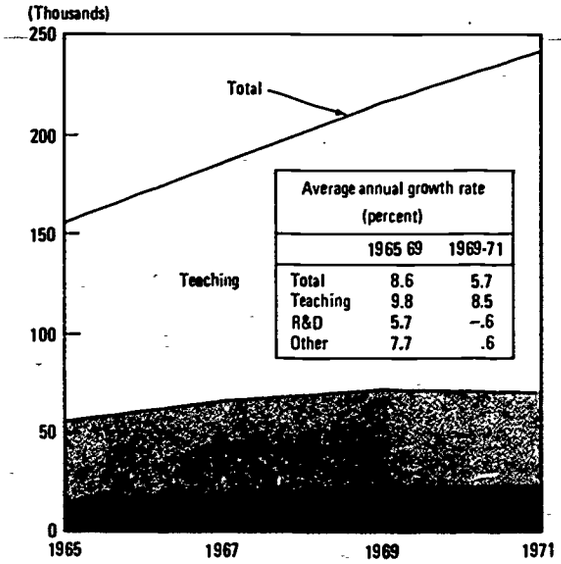


[a]Full-time equivalent
SOURCE: National Science Foundation

FTE[a] scientists and engineers employed in universities and colleges, by function



[a]Full-time equivalent
SOURCE: National Science Foundation

Scientists and Engineers

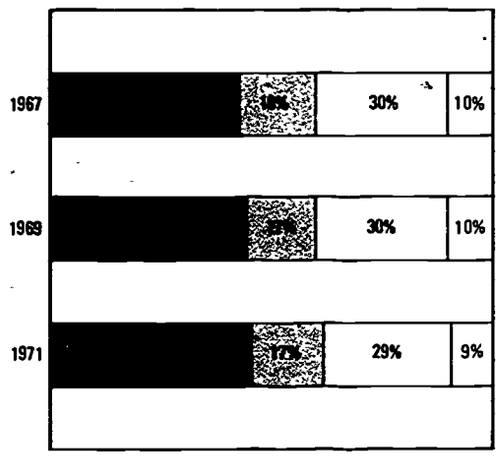
Universities and colleges employed 274,000 scientists and engineers in 1971,[2] an increase of 5 percent per year over the 246,000 employed in 1969. This represents a reduced rate of increase from the 8-percent annual growth between 1965 and 1969. Part-time faculty and other professional staff continued to account for approximately one-fifth the total number of scientists and engineers. A large proportion of these professionals are utilized in evening programs in institutions located in large metropolitan areas. Another sizable group are health-professionals employed in medical schools and university-owned hospitals.

In terms of the full-time-equivalent (FTE) number of R&D scientists and engineers, however, universities and colleges reported a small decline, less than 1 percent, during the 1969-71 period, a marked change from the 6-percent average annual growth that occurred during the earlier 4 years. The latter period, 1969-71, was one of decline in the total number of R&D scientists and engineers in all sectors, of which universities and colleges account for about one-tenth. The decline in the academic sector was well below the rate of the other major sectors of the economy.

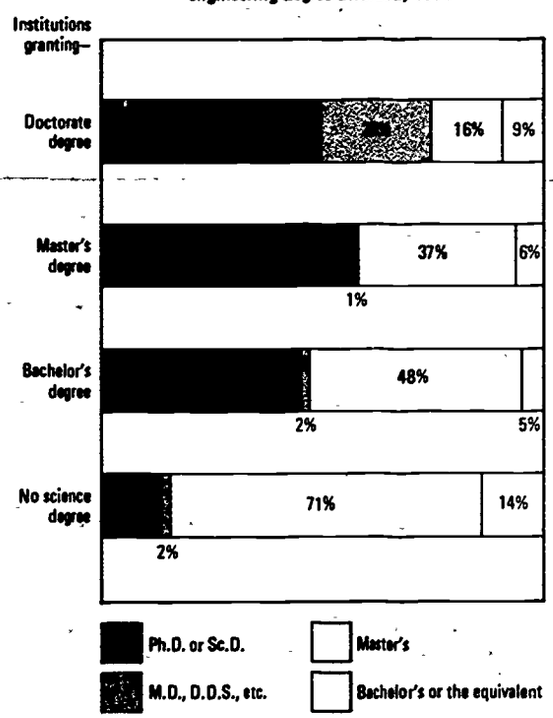
Important shifts in the functional pattern of scientific and engineering employment are developing as a result of the reduced rate of growth in Federal R&D support to universities and colleges. Consequently, the FTE's in research and development dropped from 26 percent of total employment in 1965 to 20 percent in 1971. In contrast, FTE scientists and engineers in teaching increased 9 percent per year during 1969-71, nearly matching the 10-percent annual growth during the 1965-69 period.

[2] Excludes graduate students working as scientists and engineers. These students are covered separately in a later section.

Educational attainment of scientists and engineers employed in universities and colleges



In institutions grouped by highest science or engineering degree awarded, 1971



SOURCE: National Science Foundation.

Educational Attainment

The attainment of the doctorate degree is increasingly important for employment within the academic sector. Since 1965 the proportion of employed scientists and engineers with doctorate degrees has further increased while the proportion of master's and bachelor's degree holders have declined.

In 1971, nearly two-thirds of all scientists and engineers employed at universities and colleges had a Ph.D. or a health-professional doctorate. This high proportion with doctorate degrees is attributable to the fact that most doctorate-granting institutions require an earned doctorate as a prerequisite for acquiring tenure faculty rank. Consequently, three-fourths of all the scientists and engineers in doctorate-granting institutions hold a doctorate degree, while in nonscience-degree-granting institutions,[3] doctorate holders account for only 15 percent of the total.

Field of Employment

Each field of employment has maintained a relatively constant share of the total throughout the 1965-71 period. The most significant adjustment occurred in the social sciences, growing from 18 percent of the total in 1965 to 22 percent in 1971. Employment in the life sciences has increased steadily, although at a moderate 7-percent annual rate from 1965 to 1971. Other areas such as mathematics and psychology experienced rapid growth from 1965-69, and rather moderate growth during the 1969-71 period.

[3]Here and elsewhere in this report, the terms "no-science-degree" refers to institutions that offer no degrees in the sciences and engineering at the baccalaureate or higher level.

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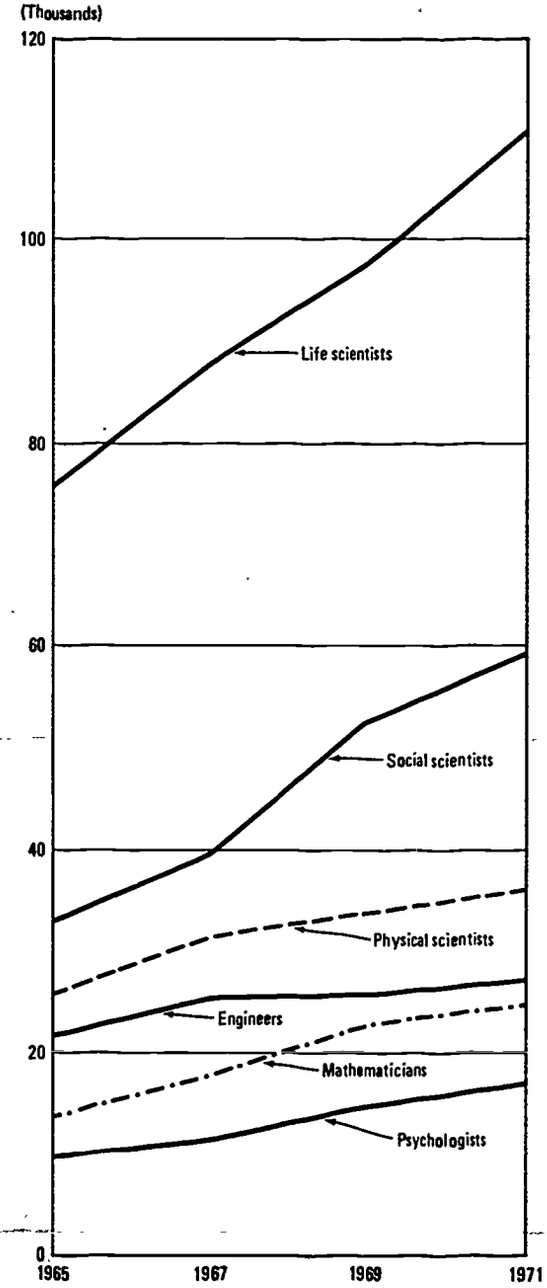
Scientists and engineers employed in universities and colleges, by field of employment



SOURCE: National Science Foundation (Appendix Table B-2)

[3] Here and elsewhere in this report, the terms "no-science-degree" refers to institutions that offer no degrees in the sciences and engineering at the baccalaureate or higher level.

Function

The primary function of scientists and engineers in the academic sector shifted towards more teaching and less research between 1965 and 1971. During this period those employed primarily as teachers increased from 68 percent of total employment in 1965 to 73 percent in 1971, while those primarily engaged in research declined. Those teaching in the social sciences, psychology, and mathematics significantly increased their share of the total reported primarily as instructors. In contrast, no appreciable change in the distribution of research scientists occurred. Life scientists continued to account for three-fifths the number engaged primarily in R&D activities.

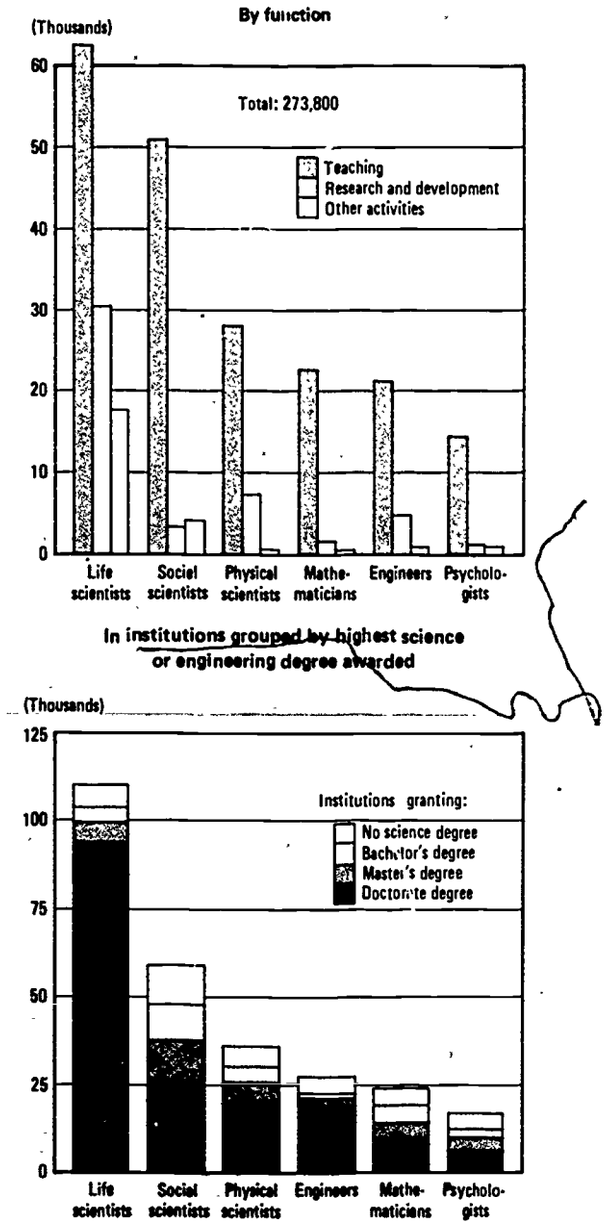
Type of Institution

Doctorate-granting institutions employed 64 percent of all scientists and engineers and 86 percent of the life scientists in the university and college sector. The principal factor contributing to this concentration is the large number of personnel employed in university-affiliated medical schools, hospitals, and agricultural experiment stations.

Medical schools and their affiliated hospitals and clinics employed 56,000 scientists and engineers, or 20 percent of those employed in all units of universities and colleges. Nearly all of the scientists employed at medical schools were life scientists and 84 percent of these were engaged in the medical sciences. These personnel accounted for 77 percent of all the medical scientists in the higher education sector.

Social scientists rank second in terms of numbers employed, with 22 percent of the sector total. Their influence on employment levels within institutions granting master's, bachelor's, or no-science degrees is, however, significant since they represent the predominant field of science with 36 percent, 39 percent, and 30 percent of the total, respectively.

Scientists and engineers employed in universities and colleges, by field, 1971



SOURCE: National Science Foundation (Appendix Table B-4)

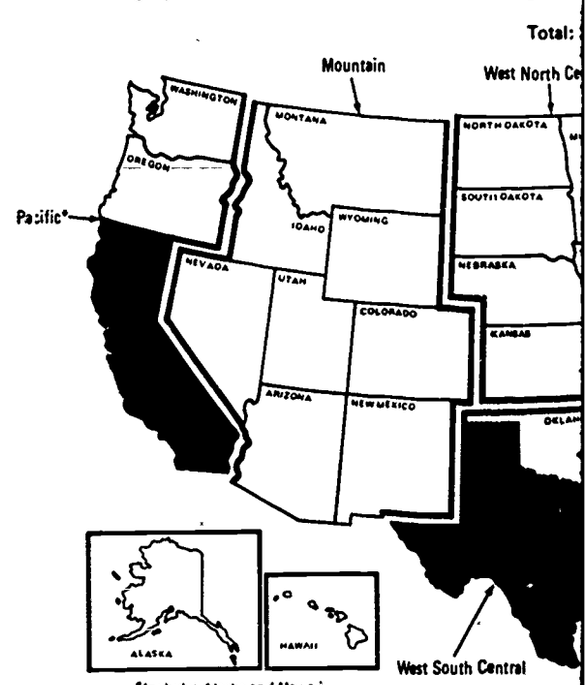
Geographic Distribution

Universities and colleges in the highly urbanized Middle Atlantic and East North Central divisions account for 39 percent of total scientific and engineering employment. This ratio has remained constant for the last 6 years.

Institutions in the West North Central division maintained a 7-percent annual growth from 1969-71; however, this was significantly below the 10-percent rate established between 1965 and 1969. The New England growth also slowed from a 9-percent annual rate between 1965 and 1969 to only 3 percent in the 1969-71 period. Harvard University and the Massachusetts Institute of Technology together employed 800 fewer scientists and engineers in 1971 than in 1969.

There were seven States with 10,000 or more scientists and engineers employed in their universities and colleges; together these seven accounted for 47 percent of the U.S. total. New York educational institutions lead the list with 34,000 scientists and engineers followed by California with 27,000.

Geographic distribution of scientists and enginee



*Includes Alaska and Hawaii

SOURCE: National Science Foundation (Appendix Table B-7)

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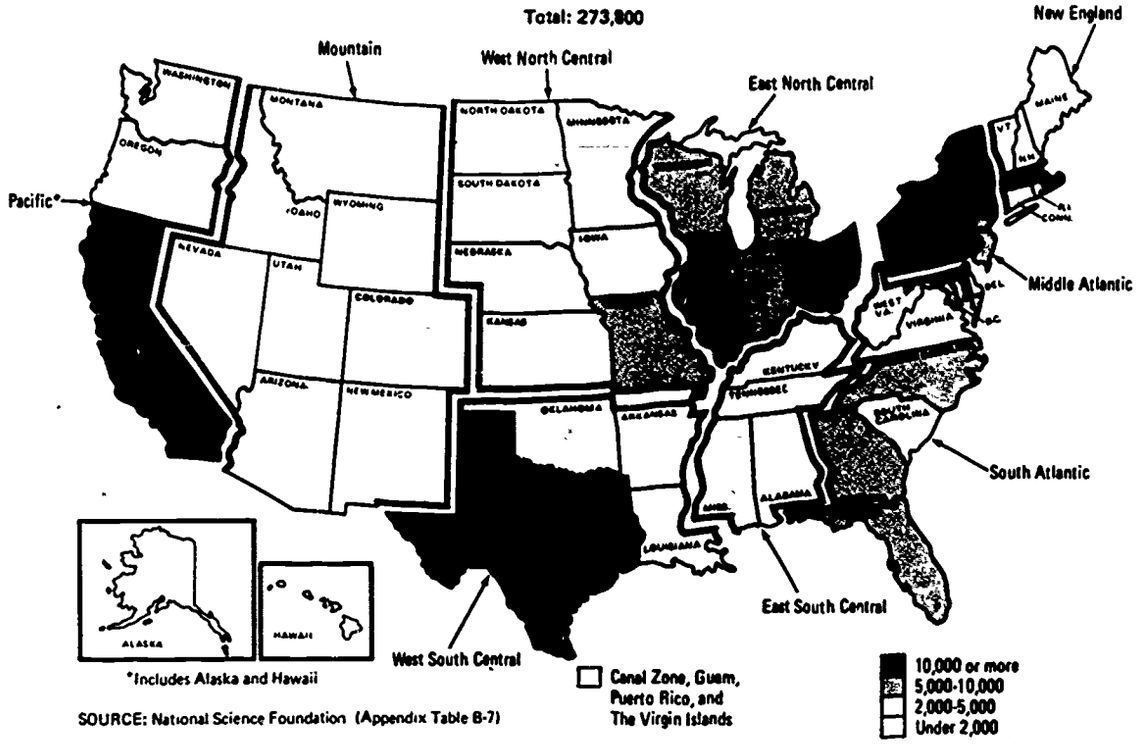
Geographic distribution of scientists and engineers employed in universities and colleges, 1971



SOURCE: National Science Foundation (Appendix Table B-7)

Graduate Students

This portion of the report summarizes statistical data on graduate students who devote part of their time to graduate study while also receiving compensation for part-time work. This category includes graduate students receiving compensation as teaching or research assistants and those receiving other forms of financial aid that require professional services in the sciences and engineering. Excluded are graduate students receiving nonduty stipends and others who may be engaged in scientific and engineering activities on a noncompensatory basis.

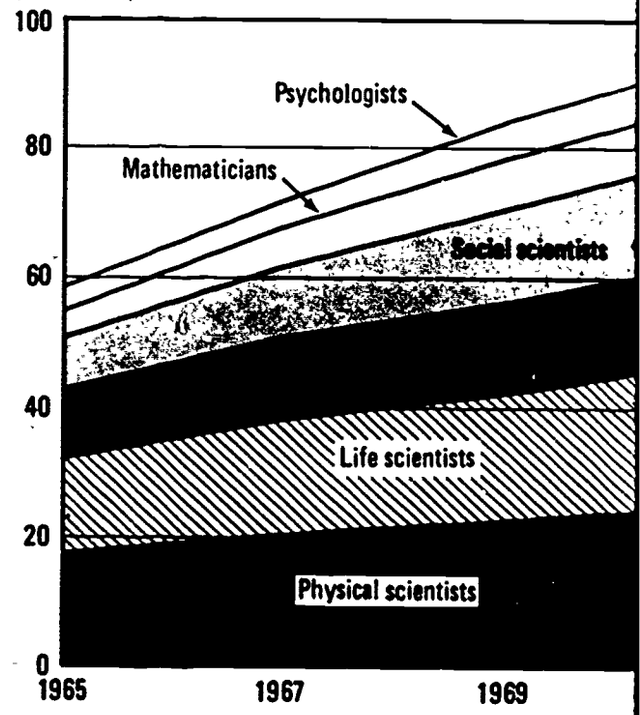
Total graduate enrollment in the sciences and engineering increased at a 6 percent annual rate between 1965 and 1971, while employed graduate students increased by 8 percent per year. During this period *employed* graduate students increased from 22 percent of total enrollment in 1965 to 26 percent in 1971.

The 94,000 graduate students employed in universities and colleges in 1971 represent an annual growth of 6 percent over the 84,000 employed in 1969. This is a significant decrease from the 10-percent annual increase rate established between 1965 and 1969. Especially affected were students working in the physical sciences. These students, accounting for 26 percent of the graduate student total, experienced the lowest annual growth rate between 1969 and 1971, at 3 percent.

In terms of full-time equivalents, employed graduate students numbered 43,000 with an annual growth rate of only 3 percent. Like scientists and engineers, the number of FTE graduate students working on R&D projects experienced slower growth; the increase in their FTE numbers has fallen from an annual rate of 8 percent in the 1965-69 period to only 2 percent per year from 1969-71.

Graduate students employed[a] in universities and colle

(Thousands)



[a]Graduate students receiving compensation for part-time se

SOURCE: National Science Foundation (Appendix Table

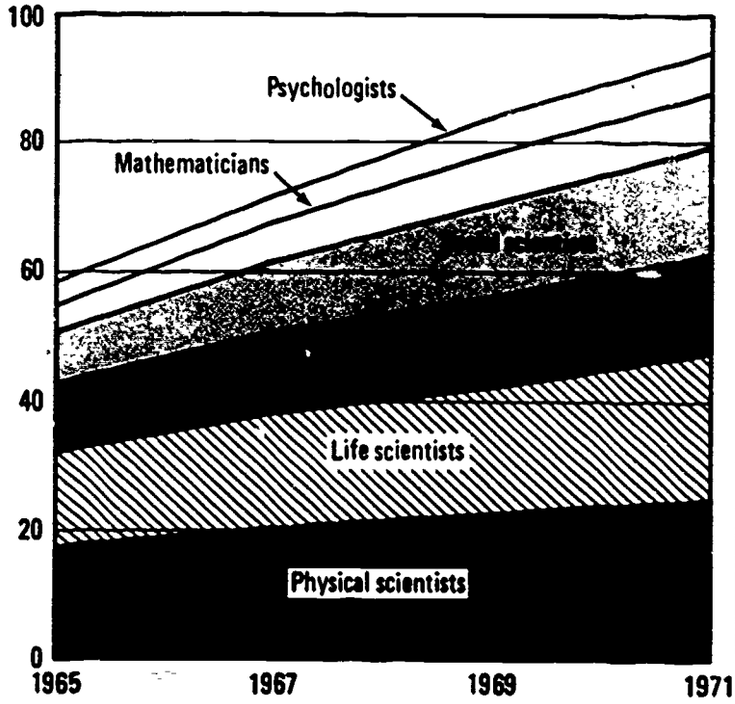
Number of graduate students receiving compensation for part-time servi and FTE graduate students, by function

[Numbers in thousan

Function	1965
Number of graduate students	58.4
FTE graduate students	27.6
Teaching	13.8
Research and development	13.0
Other activities	.8

Graduate students employed[a] in universities and colleges, by field of employment

(Thousands)



	Average annual growth rate (percent)	
	1965-69	1969-71
Total	9.6	5.9
Social scientists	17.3	6.1
Psychologists	16.3	8.4
Mathematicians	13.0	4.4
Life scientists	7.3	8.2
Physical scientists	6.9	2.8
Engineers	6.6	7.1

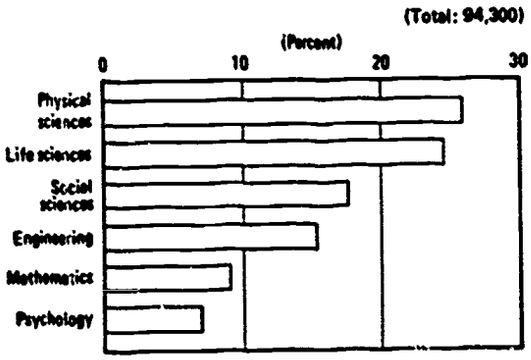
[a]Graduate students receiving compensation for part-time services as scientists or engineers.
SOURCE: National Science Foundation (Appendix Table B-11)

Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, and FTE graduate students, by function, selected years, 1965-71

[Numbers in thousands]

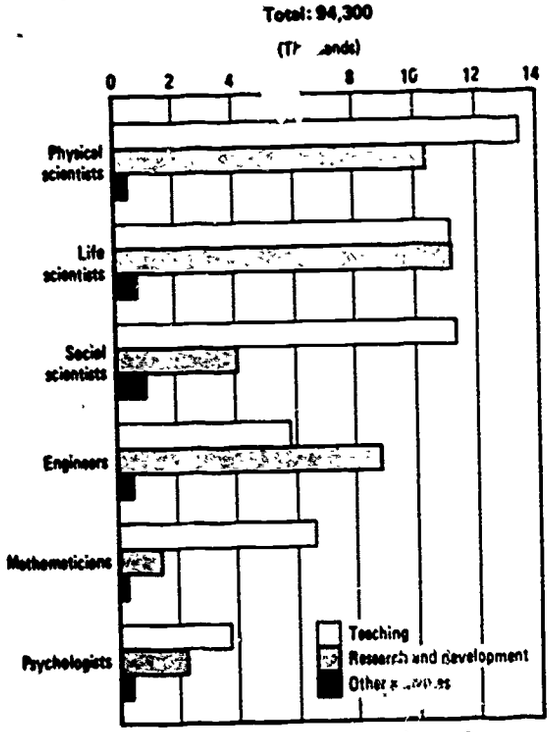
Function	January				Compound annual rate of increase (percent)	
	1965	1967	1969	1971	1965-69	1969-71
Number of graduate students	58.4	71.8	84.1	94.3	9.6	5.9
FTE graduate students	27.6	33.8	40.3	43.0	9.9	3.3
Teaching	13.8	16.2	20.7	22.8	10.7	5.0
Research and development	13.0	16.6	17.9	18.6	8.3	2.0
Other activities	.8	1.0	1.7	1.6	20.9	−4.3

Graduate students employed in universities and colleges, by field of employment, 1971



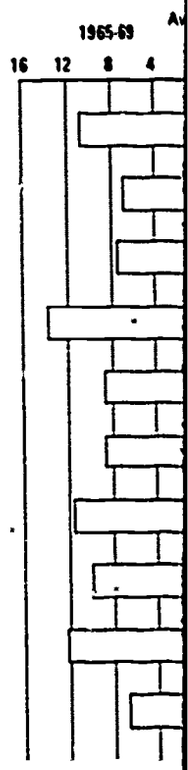
SOURCE: National Science Foundation (Appendix Table B-11)

Graduate students employed in universities and colleges, by field and function, 1971[a]



[a]Graduate students receiving compensation for part-time services as scientists or engineers.
SOURCE: National Science Foundation (Appendix Table B-11)

Graduate studer colleges, by geo



SOURCE: National Sc

The FTE number of graduate students working as teaching assistants or instructors maintained a higher growth pattern than those working on R&D projects. Strength in the employment of graduate students as instructors in the life and social sciences as well as recent limitations of R&D funding account for the variance in growth patterns between graduate students in these two activities.

The physical and life sciences together accounted for one-half the number of teaching or research assistantships in 1970, and provided employment for one-half the number of graduate students working as scientists in 1971.

Graduate students working primarily as teaching assistants comprised the greatest proportion of employed students in all of the broad fields except the life sciences and engineering. In the life sciences both teaching assistants and those primarily working on R&D projects numbered 11,200. However, 58 percent of the graduate students employed as engineers were primarily working on R&D projects.

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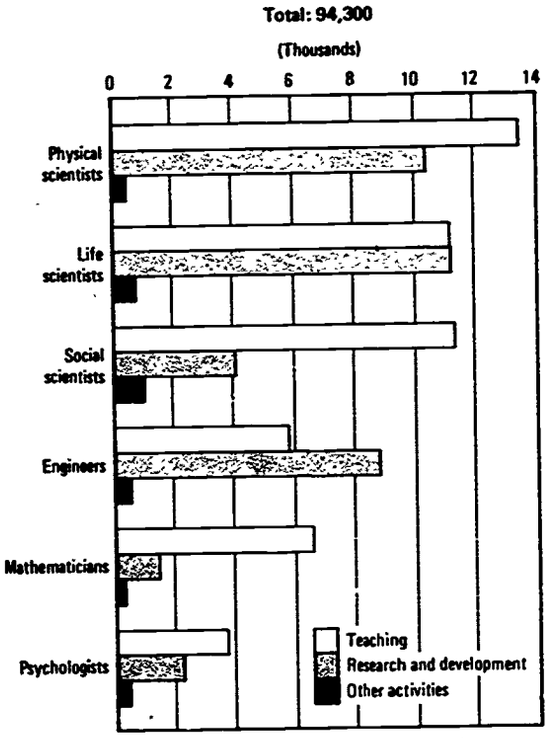
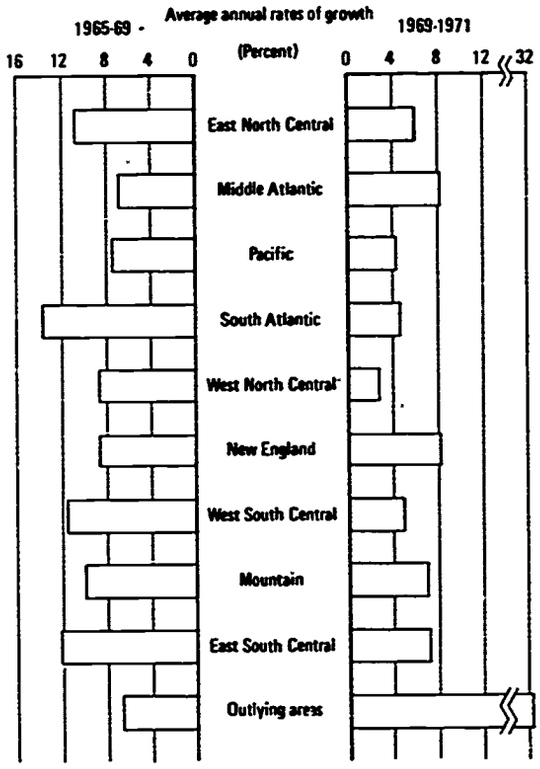
Graduate students employed in universities and colleges, by field and function, 1971[a]



[a]Graduate students receiving compensation for part-time services as scientists or engineers.
SOURCE: National Science Foundation (Appendix Table B-11)

Graduate students employed in universities and colleges, by geographic division



SOURCE: National Science Foundation (Appendix Table B-13)

From 1969 to 1971, institutions in the Middle Atlantic division increased employment of graduate students at an annual rate of 8 percent, a higher rate than in the previous 4-year period. All other divisions experienced declining rates of growth in the current period when compared with employment patterns established between 1965 and 1969. The West North Central division was hardest hit, dropping from an annual growth of 9 percent from 1965-69 to only 3 percent in the 1969-71 time frame.

Technicians

Trends, 1965-71

The recent leveling off of Federal R&D support to universities and colleges has imposed more severe limitations on technician employment than on science professionals. Since 1969 technicians have experienced a slight decline in numbers compared with a 9-percent annual increase from 1965-69. This curtailment in employment has affected technicians employed in both R&D and "other" activities at universities and colleges.

Field of Employment and Function

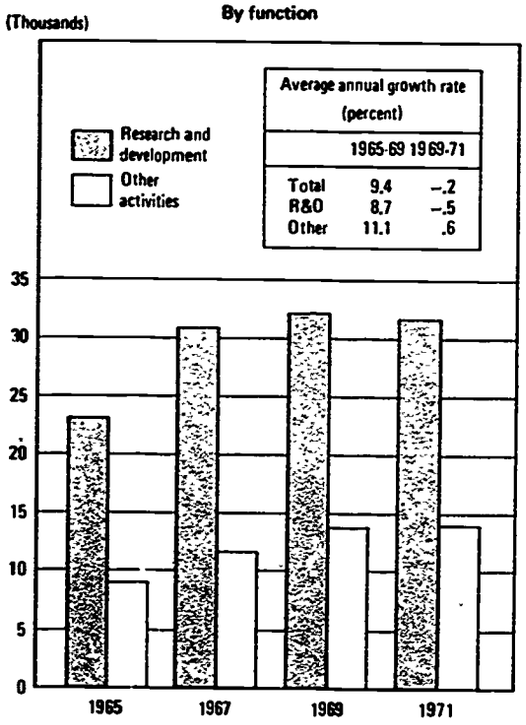
The life sciences accounted for three-fourths of all science and engineering technicians employed at universities and colleges in 1971. Medical and health-related technicians working primarily in medical schools and affiliated hospitals alone represent 36 percent of the technician total. Biological technicians working in agricultural experiment stations along with large numbers in medical schools account for an additional 28 percent of the total.

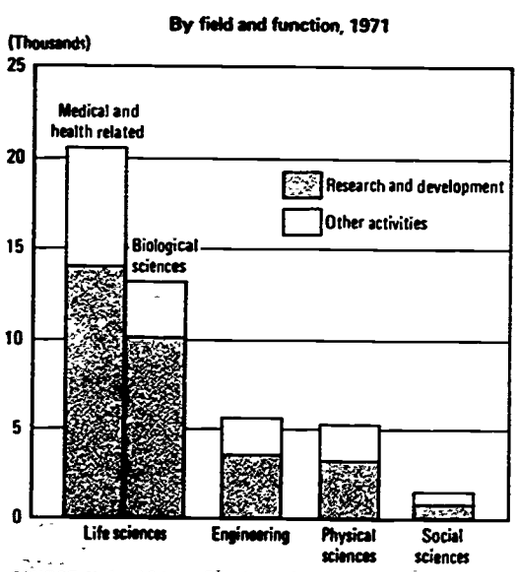
Although 69 percent of all technicians were primarily employed on R&D projects in 1971, this ratio varied considerably when analyzed by field of employment. The heaviest concentration of R&D technicians, 77 percent, occurred in the biological sciences compared with only 58 percent in the social sciences.

Type of Institution

Science technicians are almost exclusively employed at doctorate-granting institutions where extensive research in life science facilities requires large numbers of support personnel. Medical schools were the principal employer of technicians, accounting for 46 percent of the academic sector total. More than three-fourths of these were medical technicians, with most of the remainder working in the biological sciences.

Technicians employed in the sciences and engineering in universities and colleges





SOURCE: National Science Foundation (Appendix Table B-16)

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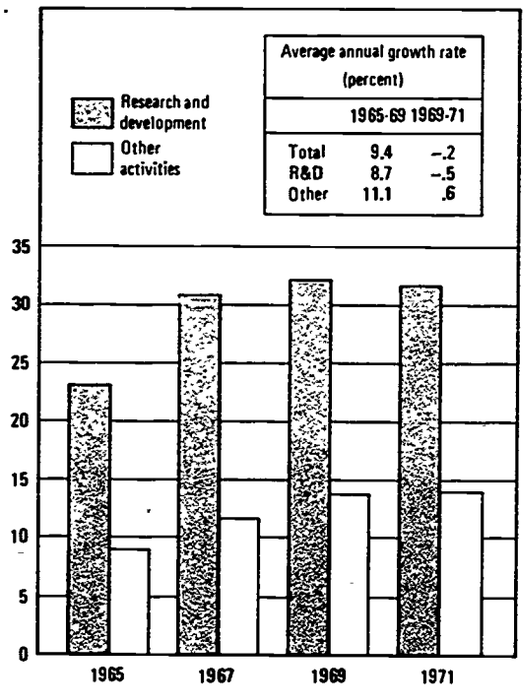
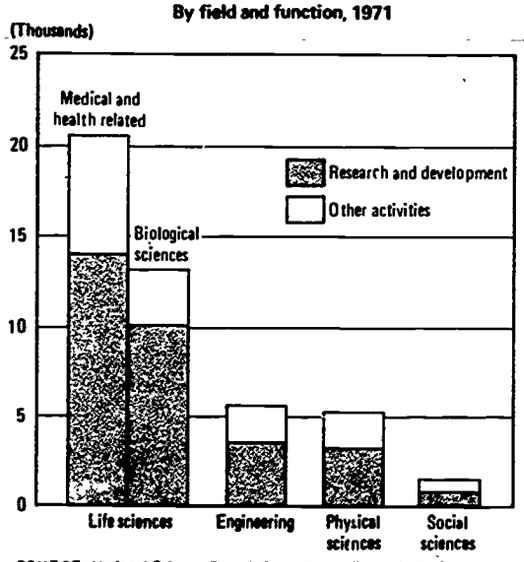
Technicians employed in the sciences and engineering in universities and colleges

By function

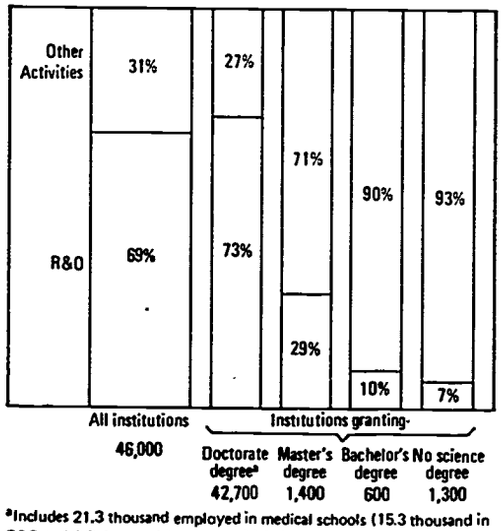


By field and function, 1971



SOURCE: National Science Foundation (Appendix Table B-16)

Technicians employed in universities and colleges grouped by highest science and engineering degree awarded, by primary function, 1971



[a]Includes 21.3 thousand employed in medical schools (15.3 thousand in R&D and 6.0 thousand in other activities)

SOURCE: National Science Foundation (Appendix Table B-16)

Technician-Professional Ratios

In carrying out R&D activities, doctorate-granting institutions averaged 65 technicians per 100 FTE research professionals. This moderate utilization of technicians in R&D performance is more pronounced in medical schools where the ratio is nearly one technician per scientist or engineer.

Number of technicians per 100 FTE scientists and engineers in universities and colleges grouped by highest science or engineering degree awarded, by function in which primarily employed, 1971

Type of institution	Total	Research and development	Other activities
Total	19.0	64.1	7.3
Institutions granting:			
Doctorate:			
Total	27.2	65.2	10.4
Medical schools . . .	46.9	93.8	20.7
Master's	4.4	36.0	3.2
Bachelor's	2.4	13.6	2.2
No science degree	4.4	97.1	4.1

Section 2. SCIENCE EXPENDITURES

Financing of Scientific Activities

Universities and colleges in the United States allocated $7.9 billion in current and capital expenditures for research, development, and instruction in the sciences and engineering during 1970. This amount represents 33 percent of the $24.2 billion expended by universities and colleges for all types of activities, a slight decline from the 36 percent ratio established in 1968.[1]

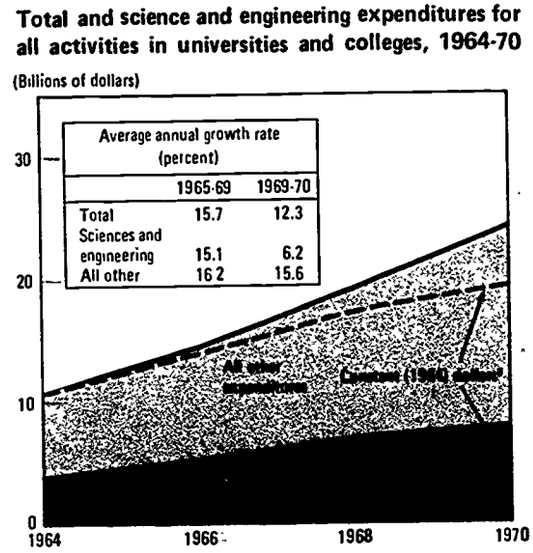
Growth in science expenditures levelled off at 6 percent per year (1 percent in constant dollars) for universities and colleges in the 1968-70 period after averaging increases of 15 percent during the previous 4 years (12 percent in constant dollars). Total nonscience funding during the 1968-70 period, however, being less sensitive to fluctuations in Federal support, advanced at an annual rate of 16 percent.

Doctorate-level institutions again, as in earlier survey years, accounted for nearly four-fifths of the total science expenditures. Nearly one-half of the remainder was spent by institutions granting the master's as the highest degree. These proportions have remained relatively stable since 1968.

The recent slowdown in the growth of science expenditures is much more apparent in private institutions than in those under public control. Between 1964 and 1968 the rates of growth in the two groups were quite similar; but between

[1] Estimates of total current and capital expenditures of universities and colleges are based on data in U.S. Office of Education, *Projections of Educational Statistics to 1979-80* (OE-10030-70) (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, 1971), p. 91. The U.S. Office of Education figures for all institutions of higher education were adjusted to exclude expenditures of university-administered FFRDC's, which are presented at the end of this report.

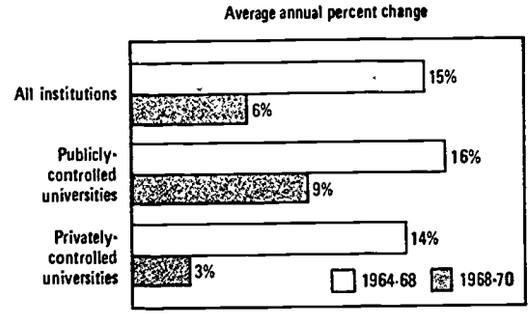
Total and science and engineering expenditures for all activities in universities and colleges, 1964-70



[a] Based on GNP implicit price deflator

SOURCE: National Science Foundation

Growth in scientific and engineering expenditures of publicly and privately controlled universities and colleges, 1964-68 and 1968-70



SOURCE: National Science Foundation (Appendix Table B-19)

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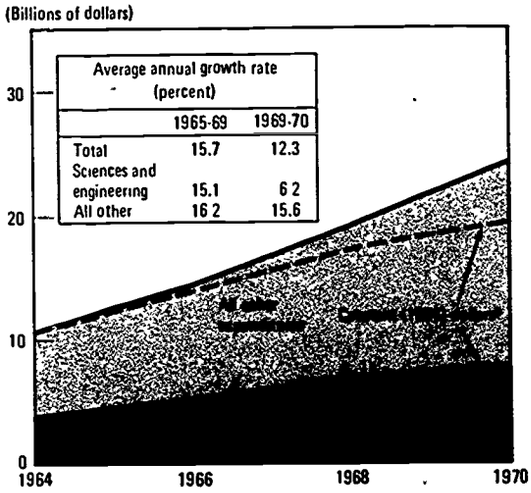
Total and science and engineering expenditures for all activities in universities and colleges, 1964-70



[a]Based on GNP implicit price deflator
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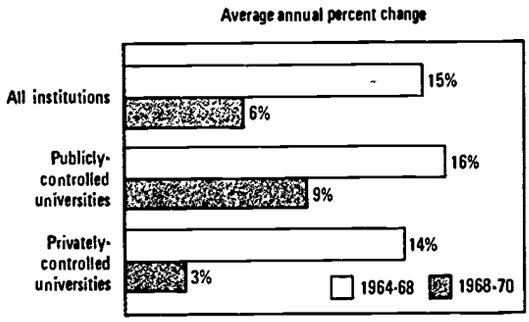


SOURCE: National Science Foundation (Appendix Table B-19)

1968 and 1970 the growth rate in private institutions was only one-third that in public institutions. Private institutions are more heavily dependent on Federal science support since public institutions receive a large share of their science expenditures from State and local government appropriations.

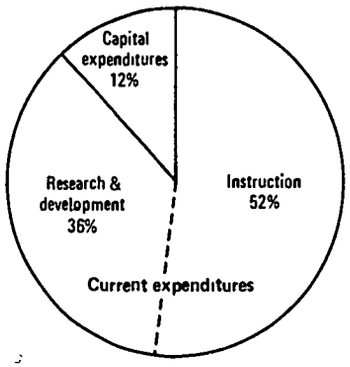
Institutions under public control numbered 1,054, including some 800 junior colleges. Although comprising only 48 percent of the institutions surveyed, this group was responsible for 64 percent of the scientific and engineering expenditures reported in the survey. Chiefly responsible were 17 large State universities with $50 million or more in science expenditures.

During the 1968-70 period, the change in funding levels varied considerably among the three types of science expenditures. Science instruction showed a substantial 11-percent annual growth while current R&D expenditures managed only 5 percent per year. Capital expenditures actually declined 5 percent per year. The following table, showing the distribution of science and engineering expenditures, emphasizes the continued growth in instruction and the levelling off of research and development and capital expenditures since 1964.

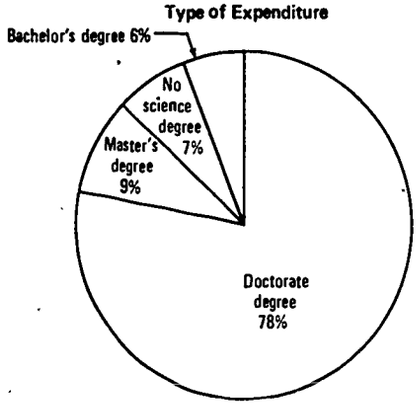
	1964	1966	1968	1970
Total science and engineering expenditures (millions of dollars)	$3,959.2	$5,129.0	$6,957.3	$7,872.5
	Percent Distribution			
Current R&D expenditures . .	40.3	40.6	37.4	36.3
Current expenditures for instruction . .	46.3	46.4	47.3	51.6
Capital expenditures .	13.4	13.0	15.4	12.1

Selected characteristics of current and capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, 1970

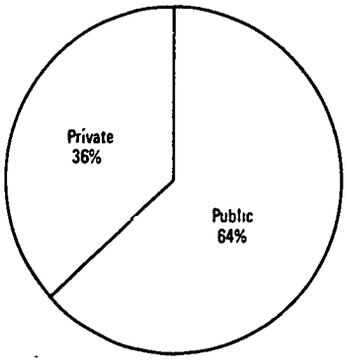
Total: $7,872.4 million



Type of Expenditure



Type of Institution
(Based on highest degree awarded)



Type of Control

SOURCE: National Science Foundation

Current R&D Expenditures

The Nation's institutions of higher education allocated $2.9 billion to current expenditures for research and development in 1970, 11 percent of total R&D expenditures reported by all sectors of the economy. The 5-percent annual growth over the 1968 total marks a considerable slowdown from the average annual increase of 13 percent between 1964 and 1968. When measured in terms of 1964 dollars, growth in the 1964-68 period drops to 10 percent per year and the 1968-70 increase is erased.

The 1968-70 decline in the rate of R&D growth in the academic sector, however, was less than that experienced in the other sectors. The proportion of the Nation's R&D effort conducted in universities and colleges has increased from 8 percent in 1964 to 11 percent in 1970.

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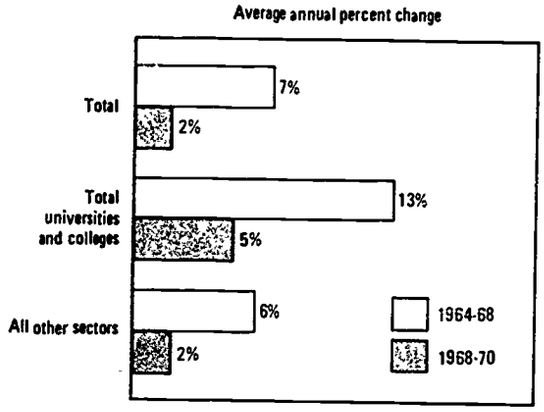
Annual rates of change in R&D expenditures of universities and colleges and all other sectors of the economy, 1964-68 and 1968-70



SOURCE: National Science Foundation

Current expenditures for research and development a

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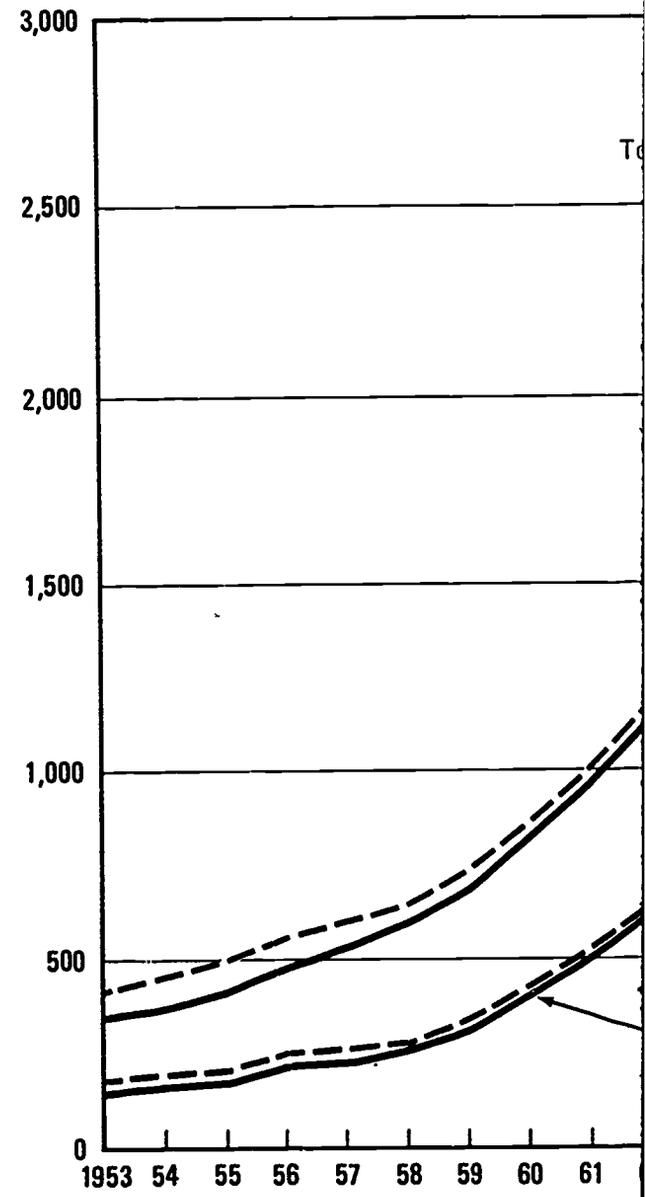


[a]Based on the GNP implicit price deflator

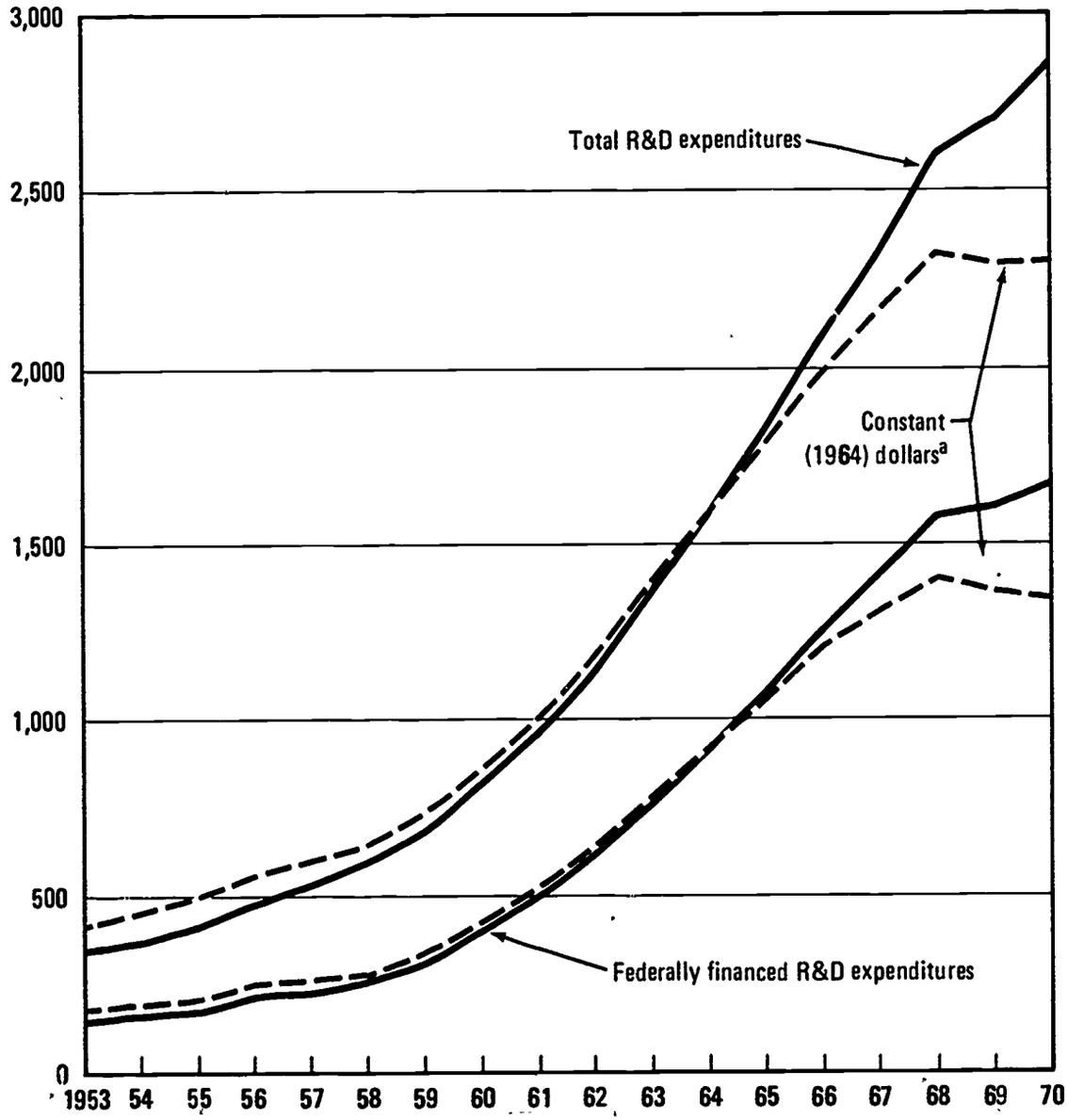
SOURCE: National Science Foundation (Appendix Table B-2

Source of Funds

Universities and colleges rely upon outside sources of support for more than three-fourths of the total funds expended for research and development. There has been a steady rise over the years in the Federal Government's share of total R&D expenditures among institutions of higher education. Since 1968, however, the Federal share levelled off at about three-fifths the academic R&D total. While Federal funds have continued to increase, their annual growth rate has fallen to 3 percent between 1968 and 1970 compared to 14 percent between 1964 and 1968. In constant dollars, Federal funds have actually declined 2 percent since 1968. Non-Federal sources of support have not compensated in total for this slowdown in Federal R&D funds.

Current expenditures for research and development at universities and colleges, 1953-1971

(Millions of dollars)



[a]Based on the GNP implicit price deflator

SOURCE: National Science Foundation (Appendix Table B-21)

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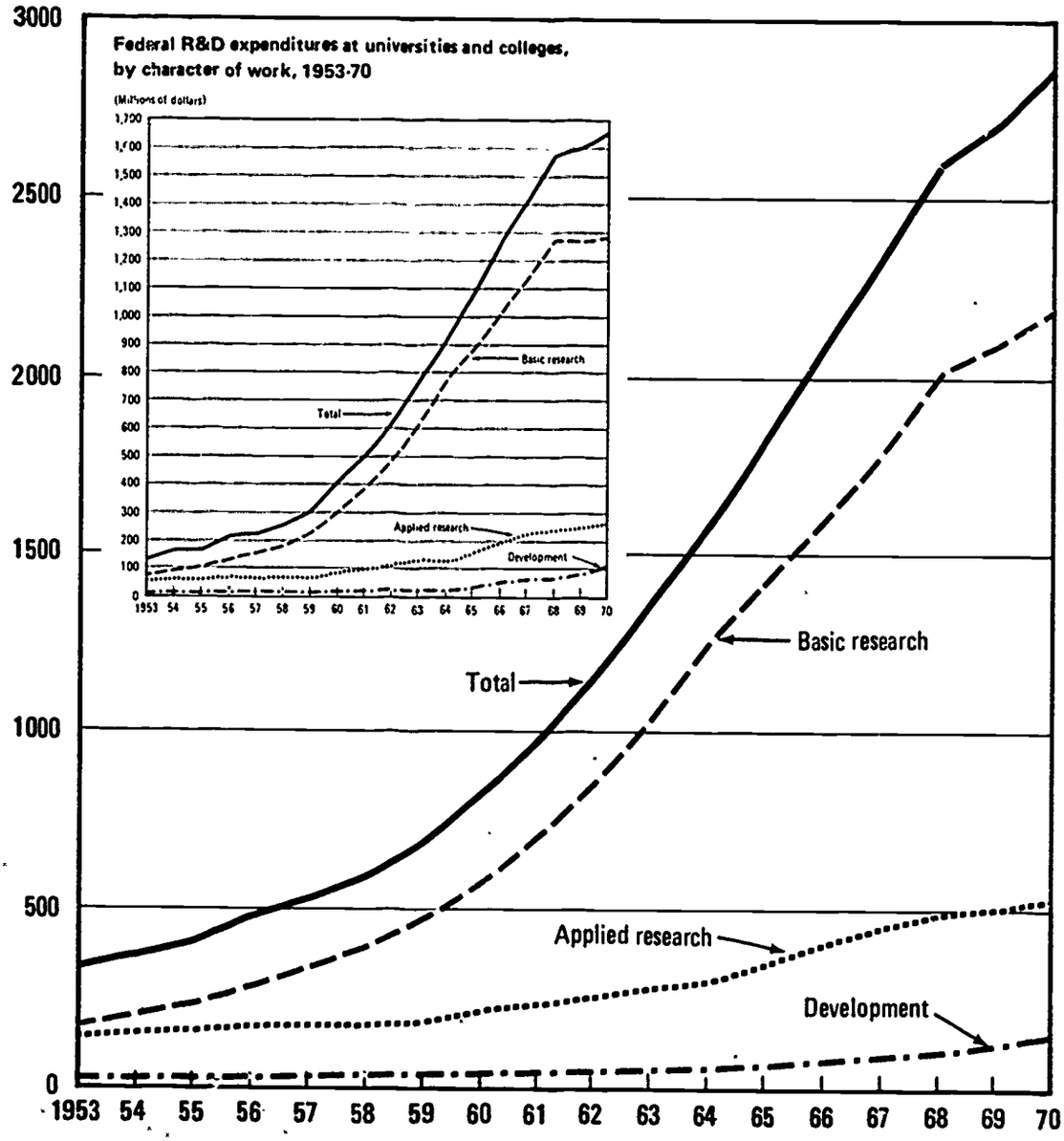
Current expenditures for research and development at universities and colleges, by character of work, 1953-70

(Millions of dollars)



SOURCE: National Science Foundation (Appendix Table B-22)

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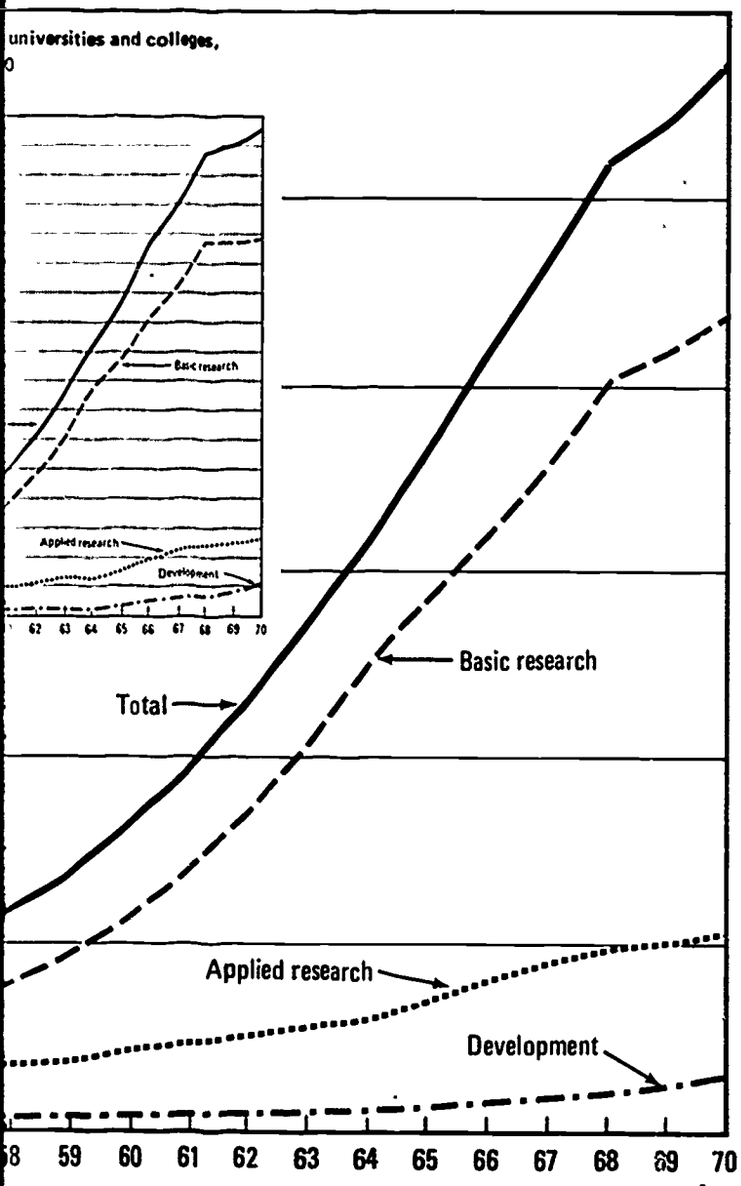


tion (Appendix Table B-22)

Character of R&D

Universities and colleges have traditionally performed more basic research than applied research and development combined; and until 1964, the trend was toward ever increasing concentration in basic research. Since 1964, however, basic research expenditures have stabilized at about 77 percent of total academic R&D expenditures; they have shown an average annual increase of 10 percent compared with a 20 percent yearly growth rate between 1953 and 1964. On the other hand, expenditures for applied research and development increased 12 percent annually between 1964 and 1970 after showing an average annual growth of only 7 percent throughout the earlier period.

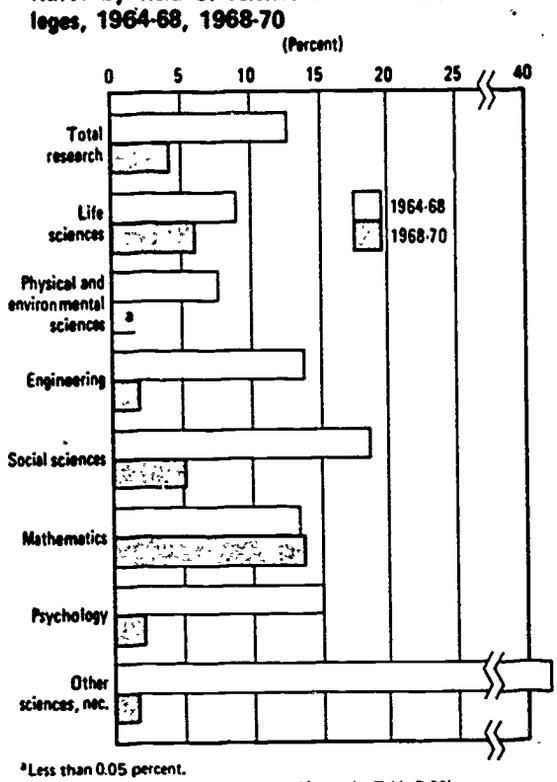
Federal funds were an important factor in this shift in emphasis. Between 1964 and 1970, Federal development funds grew an average of 29 percent annually, nearly two times the growth rate of non-Federal funding in this area. In 1964 the ratio of Federal development funds to non-Federal was 1.3 to 1; by 1970, this ratio had grown to 2.6 to 1. R&D programs of two agencies, National Aeronautics and Space Administration (NASA) and the Department of Health, Education, and Welfare (HEW), contributed heavily to the growth in development activities undertaken in institutions of higher education.

Applied research expenditures grew continuously throughout the 1953-70 period, averaging a somewhat higher average rate of increase after 1964 than in the earlier years. This increase occurred even in the face of 2 years of the smallest increase since 1955 - 2 percent in 1969 and 5 percent in 1970. This activity, however, has shown a relatively steady decline in its share of academic R&D expenditures since 1953, from 44 percent to 18 percent in 1970.

Fields of Science

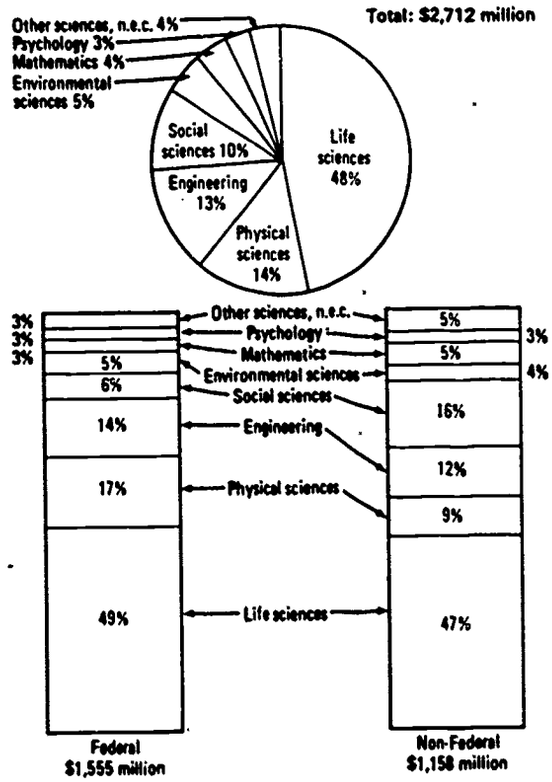
The 1964-70 period has seen very little change in the distribution of academic research expenditures among fields of science. Basic and applied research in the life sciences have averaged nearly one-half total and Federal research expenditures at universities since 1964. The growth rate in total research expenditures in this field has been steadily falling during this 6-year time span, the direct result of the slowdown in the rate of increase in Federal support. This decline in the growth rate of Federal funding for life science research is also reflected in the total expenditures reported by medical schools but to a somewhat lesser extent than experienced by other units of universities and colleges.

Average annual growth of current research expenditures by field of science in universities and colleges, 1964-68, 1968-70



[a]Less than 0.05 percent.
SOURCE: National Science Foundation (Appendix Table B-28)

Current research expenditures of universities and colleges, by field of science, and source of funds, 1970



SOURCE: National Science Foundation (Questionnaire P. 50)

Social science research performed at institutions of higher education is the only area in which Federal funds have not consistently exceeded support from all other sources. The Federal share of funding of social science research reached a high of 40 percent in 1968; in the other years between 1964 and 1970 Federal funds ranged from 33 percent to 36 percent of total social science research expenditures. Federal funding for basic and applied research in this area was actually down in 1970 from the 1968 amount as was the case in psychology, physical and environmental sciences, and engineering.

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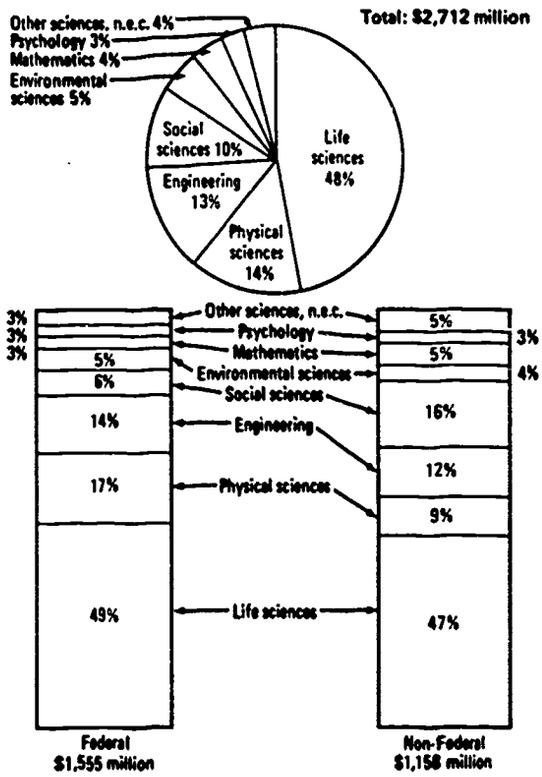
Current research expenditures of universities and colleges, by field of science, and source of funds, 1970



SOURCE: National Science Foundation (Questionnaire P. 50)

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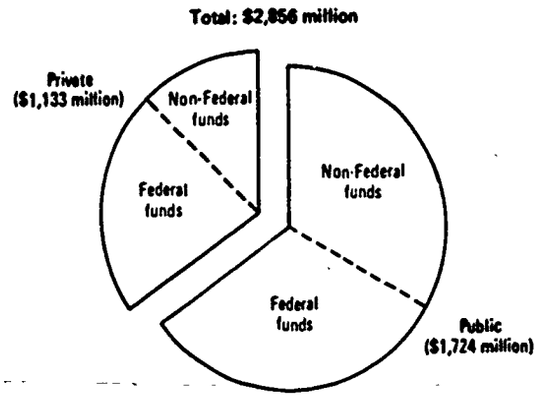
Type of Control

Publicly controlled universities and colleges accounted for three-fifths of the current R&D expenditures of all institutions. This primarily reflects the influence of the large State universities, 33 of which are among the top 50 institutions in the country in terms of R&D expenditures.

While the rate of growth in R&D expenditures has declined for both groups of institutions during the 1964-70 period, the reduction was much more severe among private institutions. For the 1964-68 period, the average annual growth rate for public institutions was 14 percent compared with 12 percent for private institutions; while in the 1968-70 period, the rates were 7 percent and 1 percent, respectively.

The Federal Government supplied 51 percent of the funds used by public institutions, compared with 69 percent of those used by institutions under private control.

Current R&D expenditures of universities and colleges, by type of control and source of funds, 1970

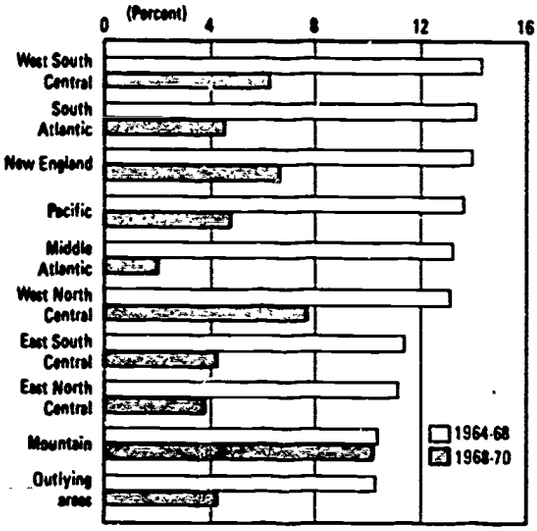


SOURCE: National Science Foundation

Geographic Distribution

During the 1964-68 period, the distribution of R&D expenditures among individual geographic divisions remained relatively stable. The rates of increases varied no more than 4 percentage points; the median growth rate was 13 percent. Between 1968 and 1970, however, the average annual increase in R&D expenditures ranged from 2 percent in the East North Central to 10 percent in the Mountain division.

Annual rates of change in current R&D expenditures of universities and colleges, by geographic distribution, 1964-68 and 1968-70



SOURCE: National Science Foundation (Appendix Table B-25)

As growth rates varied, the geographic pattern of R&D spending did show a slight shift. The highly urbanized Middle Atlantic and East North Central divisions' share of the total R&D expenditures among universities and colleges declined from 38 percent in 1968 to 36 percent in 1970, the Middle Atlantic showing the lowest growth rate of any division in the 1968-70 perio
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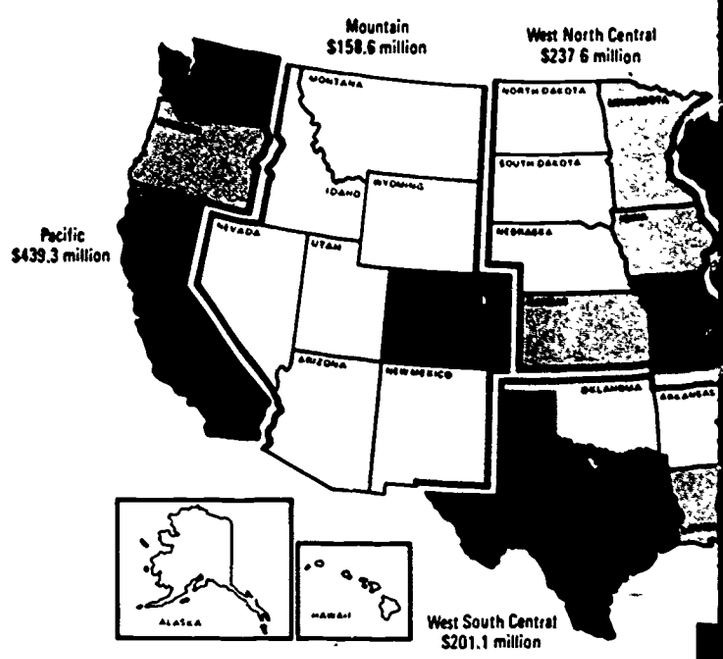
Geographic distribution of current R&D expenditur

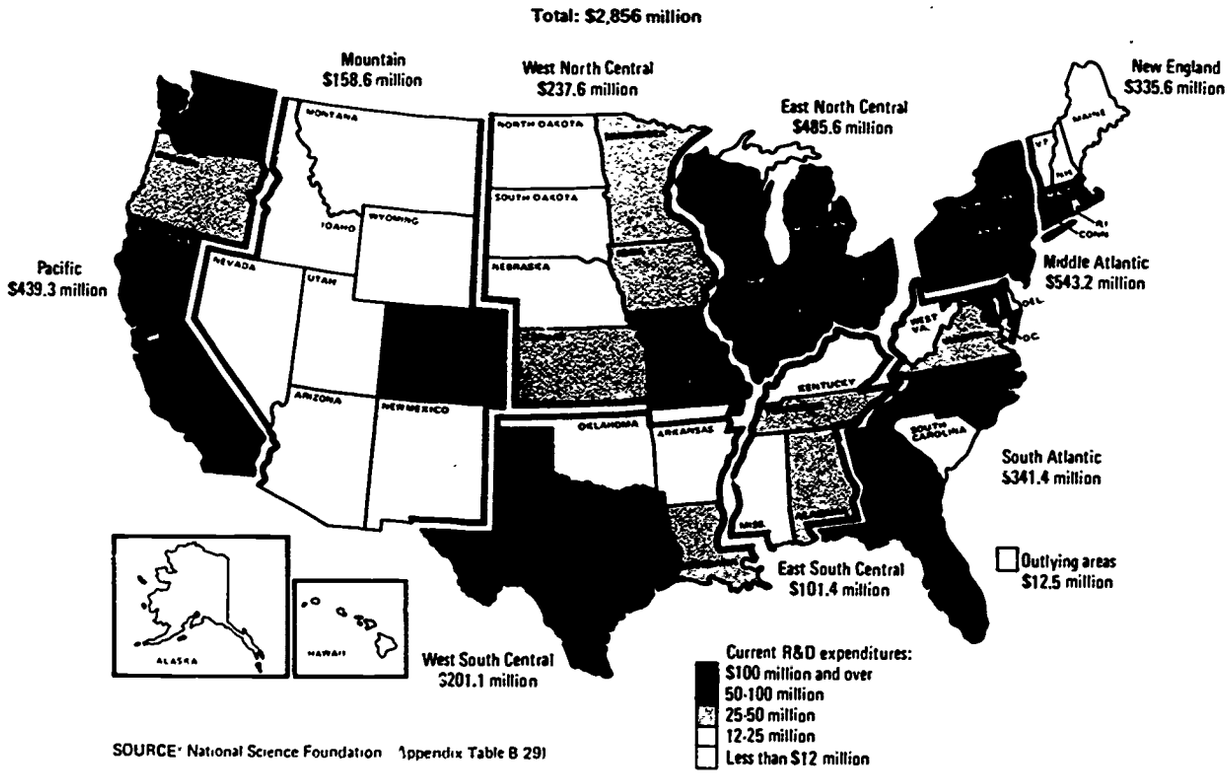
Total: $2,856 million



SOURCE: National Science Foundation (Appendix Table B 29)

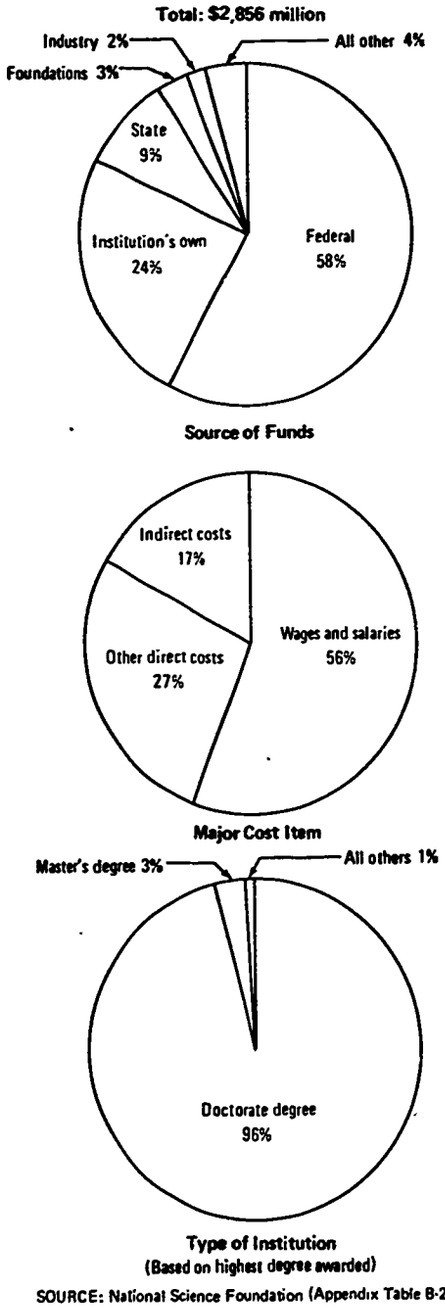
As growth rates varied, the geographic pattern of R&D spending did show a slight shift. The highly urbanized Middle Atlantic and East North Central divisions' share of the total R&D expenditures among universities and colleges declined from 38 percent in 1968 to 36 percent in 1970, the Middle Atlantic showing the lowest growth rate of any division in the 1968-70 period. Four of the seven States in which R&D expenditures of institutions of higher education totaled more than $100 million belong to these two divisions. Together, the R&D expenditures of these four States grew only 2 percent per year during 1968-70 compared to 12 percent between 1964 and 1968.

Geographic distribution of current R&D expenditures of universities and colleges, 1970



SOURCE: National Science Foundation (Appendix Table B-29)

Current R&D expenditures of universities and colleges, by source of funds, major cost item, and type of institution, 1970



SOURCE: National Science Foundation (Appendix Table B-25)

Selected Characteristics

Institutions granting doctorate degrees accounted for 96 percent of current R&D expenditures. This total includes 96 percent or more of the R&D funds from every source except institutions' own funds and private philanthropic foundations. In earlier surveys, the doctorate-granting institutions' share was slightly lower. Thus, the recent slowdown in R&D increases was felt more severely in nondoctorate-granting institutions with less prominent research facilities.

Academic institutions allocated 56 percent of their current R&D expenditures for wages and salaries in 1970. While this proportion has remained relatively constant since 1964, the slackened growth in Federal R&D support has affected the proportion allocated for materials, supplies, and other direct costs. Federal funds allocated to these purposes declined 2 percent per year since 1968, while non-Federal funds maintained an 8 percent annual growth. Other direct costs, therefore, dropped from 30 percent of the 1964 R&D total to 27 percent in 1970.

Current Expenditures for Instruction

Institutions of higher education allocated $4.1 billion of current funds to instruction expenditures in the sciences and engineering in 1970. This total includes all direct and indirect costs pertaining to educational programs for students pursuing degree-credit courses of study. Such costs include faculty salaries, stipends for graduate teaching assistants, clerical salaries, and expendable materials and supplies.

Estimates for direct and indirect expenditures for departmental research have been excluded from this section and reported as part of total R&D expenditures. The actual or reported expenditures for instruction and departmental research combined, and the methodology used

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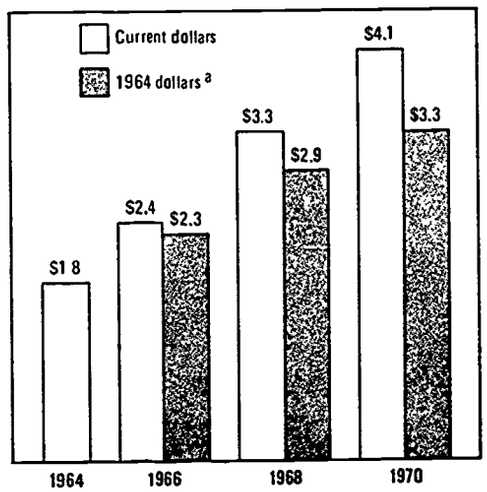
Instruction expenditures based on enrollment, are less sensitive to budgetary fluctuations than are either current or capital R&D expenditures. The $4.1 billion represents an 11-percent annual growth rate since 1968; this increase was less than the 16-percent annual rate established during the 1964-68 period. In comparison, the annual growth in R&D expenditures dropped from 13 percent during 1964-68 to 5 percent between 1968 and 1970, while the 19 percent growth in capital expenditures during 1964-68 turned into a 5 percent per year decrease. In terms of constant dollars, the rate of increase in instruction expenditures was 6 percent between 1968 and 1970.

Current expenditures for instruction in the sciences and engineering in universities and colleges

(Billions of dollars)



[a]Based on GNP implicit price deflator.
SOURCE: National Science Foundation

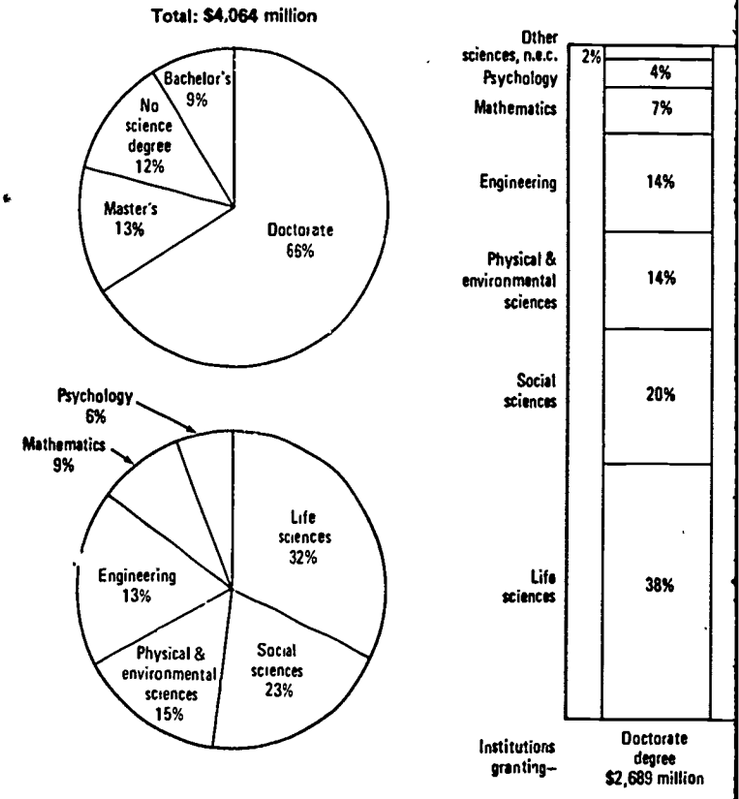
The life sciences accounted for the largest share, with 32 percent of the total, far below the 48 percent life science share of research expenditures. The life science proportion has been steadily decreasing since 1964, when it was 37 percent of the total. Social sciences, on the other hand, have been increasing throughout the same period, from 18 percent in 1964 to 23 percent in 1970. This is substantially higher than their 10 percent share of research expenditures.

Doctorate-granting institutions, although accounting for 66 percent of total instruction expenditures, did not have the near-monopoly (96 percent) displayed in the case of current R&D expenditures. The fact that all institutions included in the survey had instructional programs in the sciences or engineering partially offset the large programs evident at doctorate-granting institutions.

The life sciences accounted for the largest share of the total only in doctorate-granting institutions. In all other types of institutions, the largest proportion of current instruction expenditures was allocated to the social sciences. The uniqueness of doctorate-granting institutions is largely due to the influence of medical schools and schools of agriculture.

In medical schools, the life sciences accounted for 99 percent of all current instruction expenditures. The $581 million spent for instruction by medical schools represents a 9-percent compound annual increase rate over the 1968 figure, $488 million, which is slower than the 15-percent rate of the 1964-68 period.

Current expenditures for instruction in universities and colleges grou sciences and engineering and field of science, 1970



SOURCE: National Science Foundation (Appendix Table B-31)

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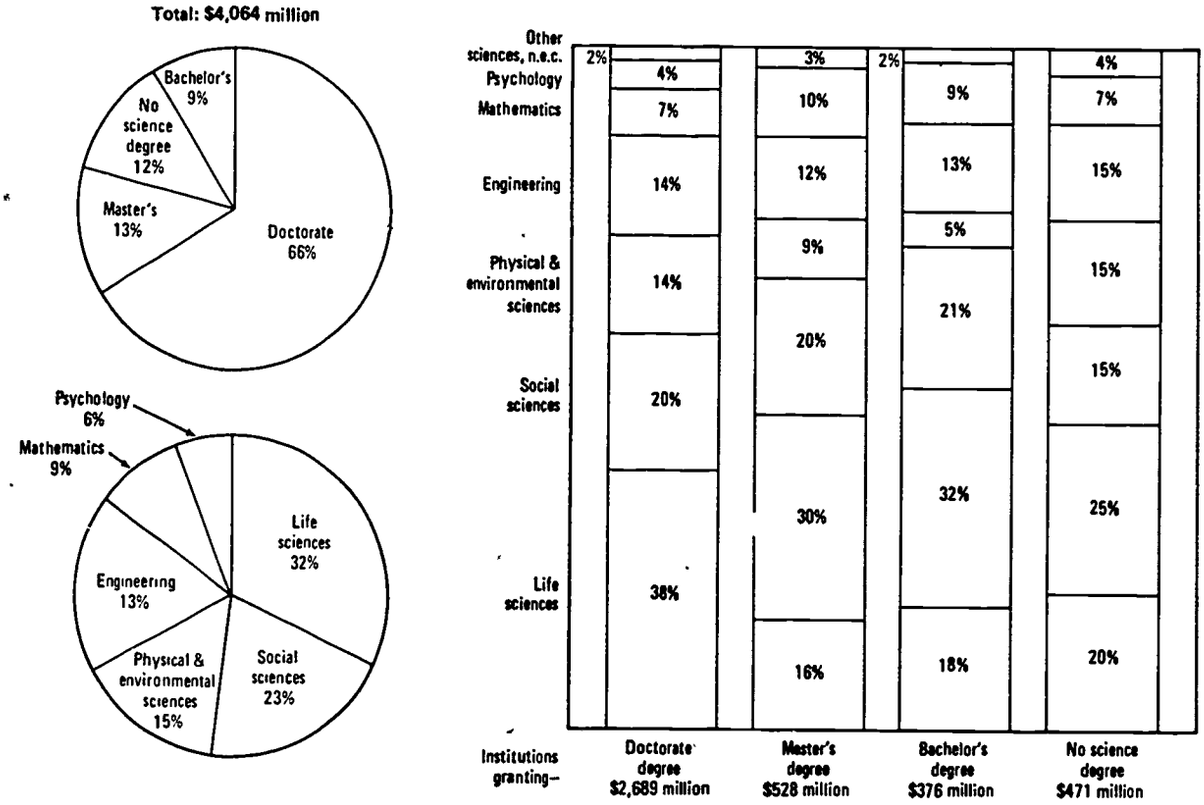
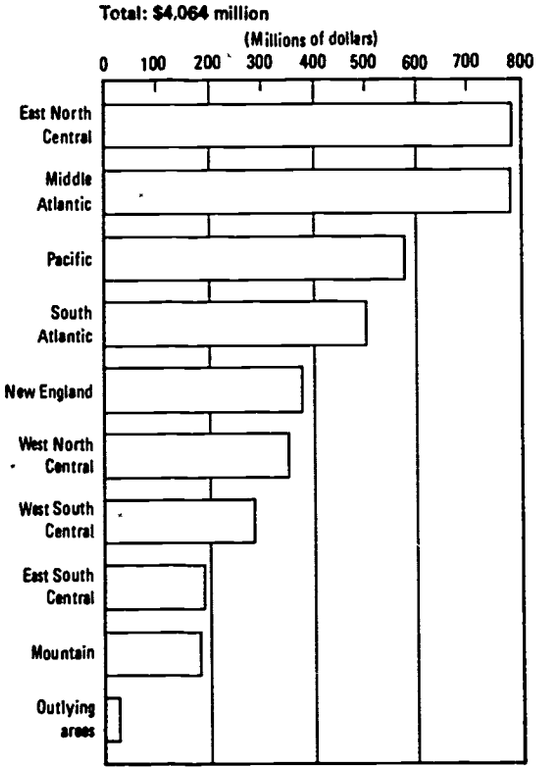
Current expenditures for instruction in universities and colleges grouped by highest degree awarded in the sciences and engineering and field of science, 1970



SOURCE: National Science Foundation (Appendix Table B 31)

Institutions in the East North Central States allocated the largest amounts to current expenditures for instruction, 19 percent of the total, followed by those in the Middle Atlantic States. The four largest divisions - these two plus the Pacific and South Atlantic States - accounted for 65 percent of the total.

Geographic distribution of current expenditures for instruction in universities and colleges, 1970



SOURCE: National Science Foundation (Appendix Table B-32)

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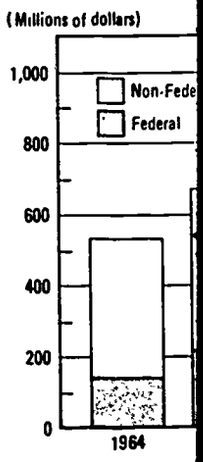

SOURCE: National Sc

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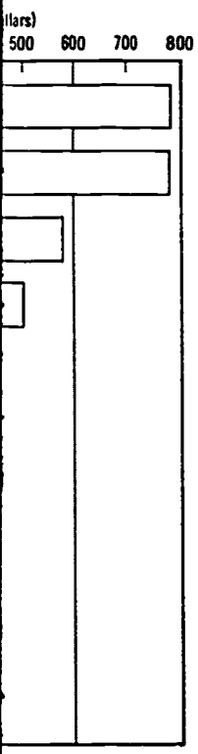


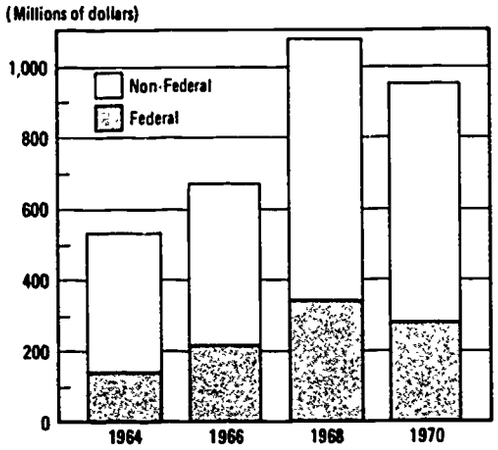
ion (Appendix Table B-32)

Capital Expenditures

Institutions of higher education allocated $952 million to capital expenditures for research, development, and instruction in the sciences and engineering in 1970, a reduction of 5 percent per year from the $1.1 billion reported in 1968. Federally financed expenditures shared in the decline as well as the earlier sharp rise. Between 1964 and 1968 Federal support increased at an annual rate of 26 percent, compared with a decline of 9 percent per year in the 1968-70 period.

The rising trend in the proportion of capital expenditures allocated to undergraduate instruction facilities was reversed between 1968 and 1970. This estimated proportion went from 45 percent of the total in 1964 to 51 percent in 1968, and back to 47 percent in 1970. The shift in Federal funds towards R&D and graduate instruction, and a 13-percent annual decline in Federal support for undergraduate facilities between 1968 and 1970, were primarily responsible.

Capital expenditures for scientific and engineering facilities and equipment, by source of funds



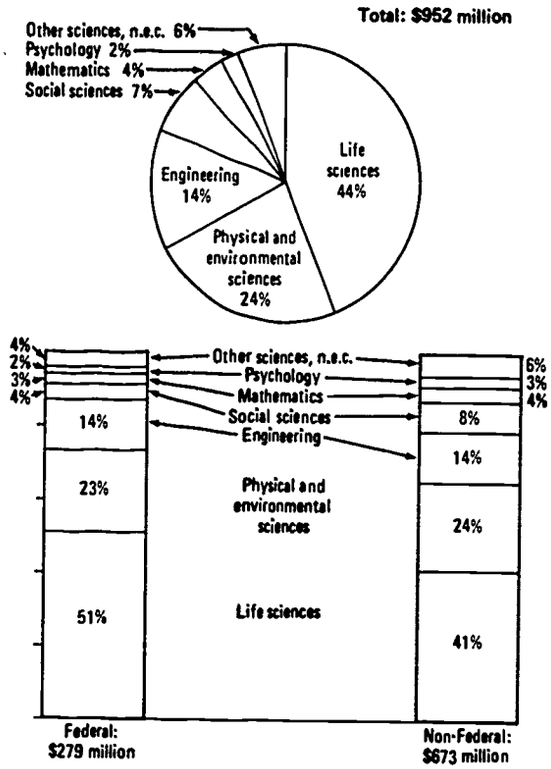
SOURCE: National Science Foundation (Appendix Table B-35)

Medical schools accounted for 22 percent of all science and engineering capital expenditures in 1970 and 37 percent of all those for research, development, and graduate instruction. Only 11 percent of the capital expenditures of medical schools were allocated to undergraduate instruction.

All fields of science shared in the phenomenal growth of capital expenditures during the 1964-68 period, with annual rates of increase ranging between 12 percent and 25 percent. During the decline in the 1968-70 period, however, two fields – engineering and other sciences, n.e.c. – continued to increase, though at much reduced rates, while expenditures in the other fields showed declining rates of up to 17 percent per year. Mathematics was the most active field, going from an increase of 25 percent per year to a decrease of 14 percent per year in the 6-year period.

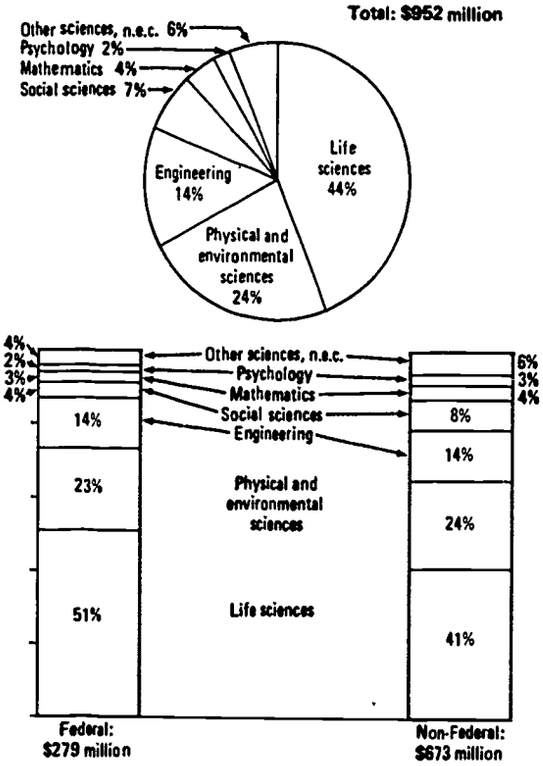
As was the case with current expenditures, the life sciences accounted for the largest portion of scientific and engineering capital expenditures. Over one-half of the capital expenditures financed by the Federal Government were allocated to the life sciences, compared with only 41 percent of those financed by other sources.

Capital expenditures for research, development, and instruction in the sciences and engineering, by field of science and source of funds, 1970



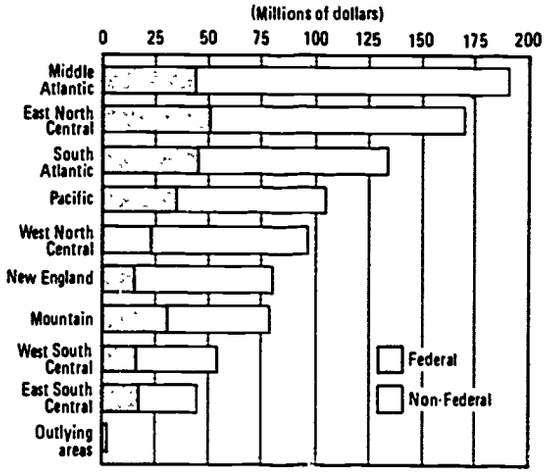
SOURCE: National Science Foundation (Questionnaire P. 60)

Capital expenditures for research, development, and instruction in the sciences and engineering, by field of science and source of funds, 1970



SOURCE: National Science Foundation (Questionnaire P. 60)

Geographic distribution of capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by source of funds, 1970



SOURCE: National Science Foundation (Appendix Table B-34)

The decline in capital expenditures between 1968 and 1970 was greatest in the West South Central and Middle Atlantic divisions, both of which reported reductions at annual rates exceeding 10 percent, while New England and the West North Central and Mountain States continued to increase.

The same four geographic divisions that accounted for the majority of current expenditures - the Middle Atlantic, East North Central, South Atlantic and Pacific States - accounted for the majority of capital expenditures. These divisions accounted for 63 percent of both total and federally financed capital.

The federally financed proportion of total capital expenditures ranged from a high of 39 percent in the East South Central and Mountain States to a low of 19 percent in New England and 14 percent in the outlying areas.

Part II

FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS ADMINISTERED BY UNIVERSITIES AND UNIVERSITY CONSORTIA

Federally Funded Research and Development Centers (FFRDC's) are R&D performing organizations substantially financed by the Federal Government to meet either a particular R&D objective or, in some instances, to provide major facilities at universities for research and associated training purposes. This report is limited to summary data on the manpower and financial characteristics of FFRDC's administered by universities and university consortia. Data presented here are excluded from those for universities and colleges shown in part I of this report.

Each FFRDC is a separate operational unit which conducts R&D work upon direct request of, or under a broad charter from, the sponsoring Federal agency. Organizationally, the centers are separate from the administering institution, and are self-contained entities insofar as their R&D work is concerned. Staffs normally are separate from those of the university; however, in some cases, staff members also hold faculty appointments with the university. Most FFRDC's, however, make their extensive facilities available to faculty and graduate students of the administering university for the conduct of research.

Section 1. SCIENTIFIC AND TECHNICAL PERSONNEL

Scientists and Engineers

The 35 university-administered FFRDC's employed 11,300 scientists and engineers in 1971. Since 1965, however, the employment level in the FFRDC's has been virtually unchanged, and small decline due to severe limitations in Federal R&D support.

The primary function of FFRDC's is R&D performance or management. It is, therefore, not surprising that virtually all scientists and engineers are engaged in R&D work.

The distribution of scientists among broad fields of employment in FFRDC's differed considerably from universities and colleges. The large numbers of engineers and physical scientists employed at FFRDC's reflect the close association between their R&D activities and the missions of their sponsoring agencies. Nearly two-thirds the research professionals at DOD- and NASA-sponsored FFRDC's were engineers while physical scientists comprised one-half the research staff at AEC-sponsored centers.

Scientists and engineers employed in university-administered FFRDC's,[a] by employment status, selected years, 1958-71

Employment status	March 1958	March 1961	January 1965	January 1967	January 1969	January 1971	Compound annual rate of change	
							1958-69	1969-71
	(Thousands)						(Percent)	
Number of scientists and engineers	8.5	8.9	11.0	10.7	11.5	11.3	2.8	−0.7
Full time	8.3	8.7	10.8	10.5	11.2	11.0	2.7	−0.6
Part time	.2	.2	.2	.2	.3	.3	5.1	−3.6
FTE scientists and engineers	8.4	8.8	10.9	10.6	11.3	11.2	2.7	−0.6
FTE R&D scientists and engineers	7.9	8.8	10.7	10.4	11.1	11.0	3.1	−0.5

[a]Federally Funded Research and Development Centers.

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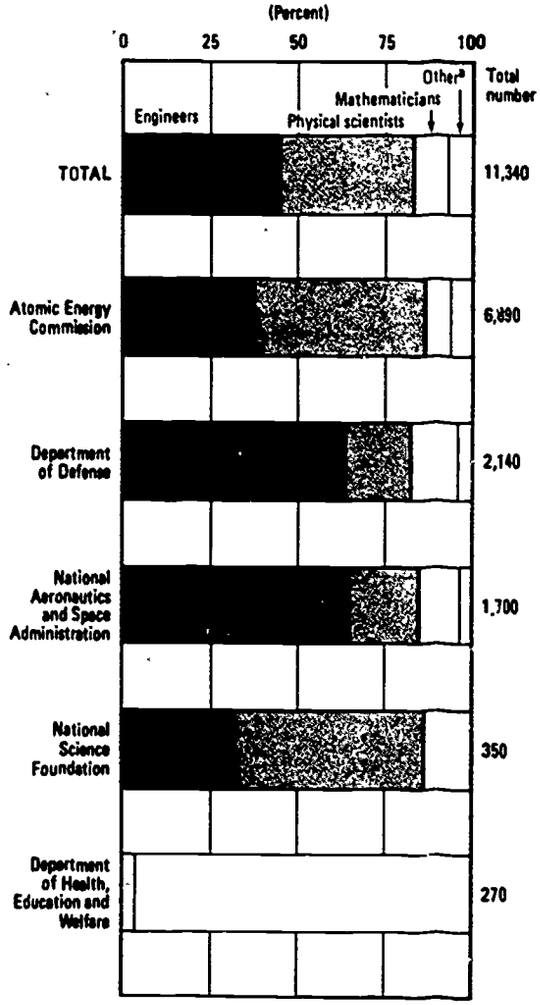
The primary function of FFRDC's is R&D performance or management. It is, therefore, not surprising that virtually all scientists and engineers are engaged in R&D work.

The distribution of scientists among broad fields of employment in FFRDC's differed considerably from universities and colleges. The large numbers of engineers and physical scientists employed at FFRDC's reflect the close association between their R&D activities and the missions of their sponsoring agencies. Nearly two-thirds the research professionals at DOD- and NASA-sponsored FFRDC's were engineers while physical scientists comprised one-half the research staff at AEC-sponsored centers.

Employment of scientists and engineers at university-administered FFRDC's, by sponsoring Federal agency and field of employment, 1971



[a]Other scientists include psychologists, life and social scientists.
SOURCE: National Science Foundation (Appendix Table D-1.)

neers employed in university-administered FFRDC's,[a]
nployment status, selected years, 1958-71

	March 1958	March 1961	January 1965	January 1967	January 1969	January 1971	Compound annual rate of change 1958-69	Compound annual rate of change 1969-71
	(Thousands)						(Percent)	
	8.5	8.9	11.0	10.7	11.5	11.3	2.8	−0.7
	8.3	8.7	10.8	10.5	11.2	11.0	2.7	−0.6
	.2	.2	.2	.2	.3	.3	5.1	−3.6
	8.4	8.8	10.9	10.6	11.3	11.2	2.7	−0.6
	7.9	8.8	10.7	10.4	11.1	11.0	3.1	−0.5

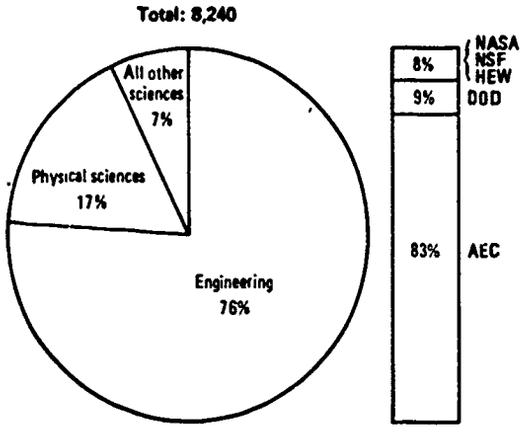
Graduate Students

FFRDC's supported by the AEC employed over one-half the graduate students employed in all such centers, and nine-tenths of those working in the physical sciences. This graduate student employment is heavily concentrated in two FFRDC's - Lawrence Radiation Laboratory and Ames Laboratory. The 10 Centers sponsored by the U.S. Office of Education (OE) employed virtually all of their graduate students on projects requiring psychologists or social scientists.

Technicians

Large numbers of technicians are employed by FFRDC's to support their professional staff. Nearly all were primarily engaged in research and development and 83 percent were employed by FFRDC's supported by the Atomic Energy Commission. The four largest AEC laboratories accounted for 71 percent of the FFRDC total. Most of the technicians are classified in engineering fields although employed by FFRDC's which primarily perform research in the physical sciences.

Technicians employed in university-administered FFRDC's, 1971



SOURCE: National Science Foundation

Section 2. FINANCING OF SCIENTIFIC ACTIVITIES

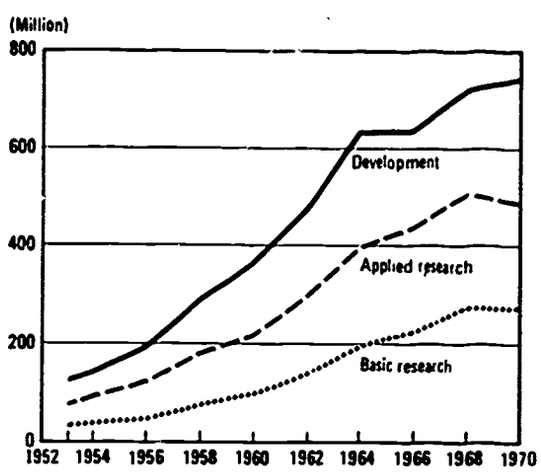
Current R&D Expenditures

University-administered FFRDC's expended $900 million in 1970 for current R&D performance and capital outlays. Although these organizations provide research opportunities for faculty and students, they do not conduct instructional programs in the sciences and engineering as defined for survey purposes.

R&D expenditures in university-administered FFRDC's increased from $121 million in 1953 to $737 million in 1970, an annual rate of 11 percent. Since 1964, however, growth has slowed to an annual rate of 3 percent.

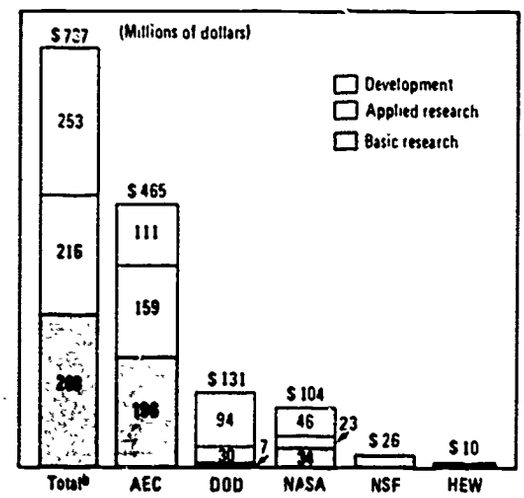
In recent years the R&D effort at FFRDC's has shifted slightly towards more development and less basic research. A significant shift from basic and applied research to development occurred at Lincoln Laboratories when their solid-state physics and computer science research became more problem-oriented rather than unstructured.

Current R&D expenditures in university-administered FFRDC's, by character of work



SOURCE: National Science Foundation (Appendix Table D-3)

Distribution of current R&D expenditures in university-administered FFRDC's,[a] by character of work and sponsoring Federal agency, 1970



[a]Federally Funded Research and Development Centers.
[b]Includes $2.7 million in non-Federal funds.
SOURCE: National Science Foundation (Appendix Table D-4)

University-administered FFRDC's sponsored by the AEC alone supported 63 percent of all current R&D expenditures and 73 percent of all basic research expenditures. DOD ranked second with 18 percent of the total and 37 percent of all development support. FFRDC's sponsored by the National Science Foundation (NSF) allocated all of their expenditures to basic research. These organizations, therefore, accounted for 10 percent of basic research expenditures compared with only 4 percent of total R&D expenditures.

Nearly three-fourths of all FFRDC research is supported by AEC and is performed in the physical and environmental sciences. Centers supported by DOD and NASA are heavily engaged in R&D projects involving precision engineering and advanced engineering applications.

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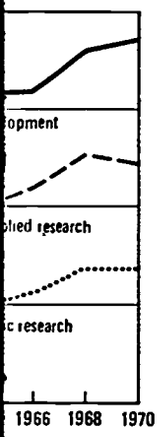
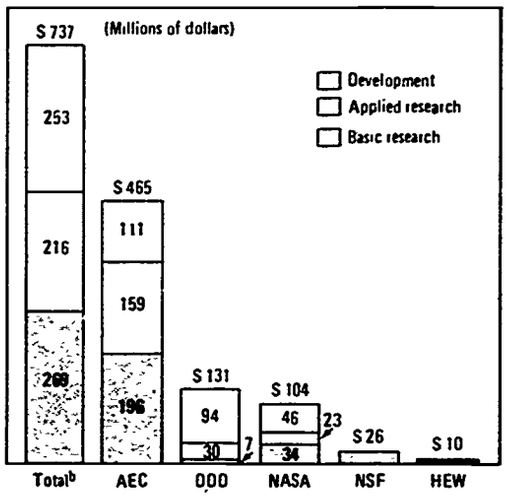


Table D-3)

Distribution of current R&D expenditures in university-administered FFRDC's,[a] by character of work and sponsoring Federal agency, 1970



[a]Federally Funded Research and Development Centers.
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SOURCE: National Science Foundation (Appendix Table D-4)

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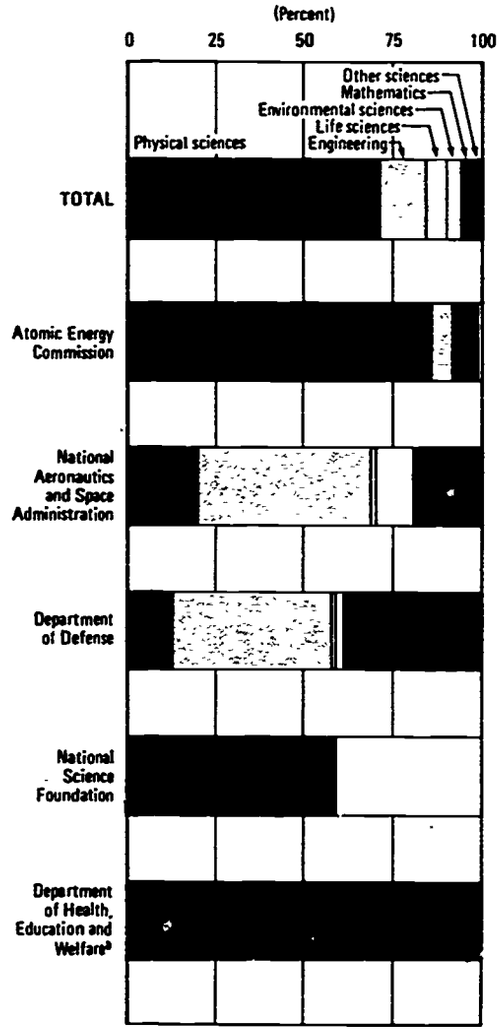
Basic and applied research expenditures of university-administered FFRDC's, by sponsoring agency and field of science, 1970



[a]Represents OE-sponsored centers conducting research in education which cuts across all fields of science.
SOURCE: National Science Foundation (Appendix Table D-4)

HEW's OE supports 10 small FFRDC's which bring research and development to bear upon educational practice and thus improve existing methods of instruction.

APPENDIXES

A. Technical notes and tables

B. Universities and colleges (part I): Statistical tables and reproduction of survey form (including aggregate data)

C. Medical Schools: Listing, statistical tables, and reproduction of survey form (including aggregate data)

D. FFRDC's (part II): Listing, statistical tables, and reproduction of survey forms (including aggregate data)

E. Covering letter and instructions

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Appendix A

Technical Notes

Scope and Coverage

This report is based on the National Science Foundation's (NSF's) "Survey of Scientific Activities of Institutions of Higher Education, 1971," the fourth in a series of biennial surveys inaugurated in 1964.[1] Survey questionnaires were mailed out in December 1970 to about 2,400 institutions of higher education, all those in the United States and U.S. possessions thought to have programs in the sciences and engineering. About 300 small schools specializing in art, music, theology, and other nonscientific fields were excluded, and a further 100 were deleted from the survey universe during the data-collection period, bringing the final total to 2,198 (appendix table A-1).

[1] Data obtained in earlier surveys in the series have been published by NSF in *Scientific Activities at Universities and Colleges, 1964* (NSF 68-22), 1968, and *Resources for Scientific Activities at Universities and Colleges, 1969* (NSF 70-16), 1970 (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office). No separate report was issued on the 1966 survey, however, results of that survey are included in summary form in the report on the 1969 survey. Data collected in the three surveys conducted prior to the inception of the present series have been published in *NSF's Scientific Research and Development in Colleges and Universities–Expenditures and Manpower, 1953-54*, 1958; *Scientific Research and Development in Colleges and Universities–Expenditures and Manpower, 1958*, 1963; and *Scientists and Engineers in Colleges and Universities, 1961*, 1965.

Followup queries were mailed out to the smaller nonrespondents in March and May of 1971; telephone contact was maintained with the 200 institutions believed on the basis of prior surveys to have spent the largest amounts on research and development from current funds. By the closeout date of July 15, usable replies had been received from 1,577 universities and colleges, or 72 percent of the universe (appendix table A-2).

Because of the intensive followup procedures employed with the larger universities, the figures are believed to be more accurate than the 28 percent nonresponse rate would indicate. Most of the nonrespondents were smaller institutions in terms of science and engineering expenditures, as is shown in the following tabulation:

Top 100 institutions	95 respondents
Second 100 institutions.	92 respondents
Top 200 institutions.	187 respondents (93.5%)
All other institutions	1,390 respondents (69.6%)

These 200 largest institutions in terms of science activities account for 95 percent of all R&D expenditures, 62 percent of the scientists and engineers employed, and 91 percent of all graduate students receiving compensation for part-time services as scientists and engineers.

Methods of Estimating for Nonresponse

Estimates for the 621 institutions which failed to return completed questionnaires were based on three types of sources: first, other surveys, such as the Higher Education General Information Survey, conducted annually by the National Center for Educational Statistics of the U.S. Office of Education and the American Council on Education's quadrennial publication, *American Universities and Colleges*[2]; second, institutional sources such as catalogs, treasurer's reports, and similar publications; and third, the completed questionnaires of the individual institutions for earlier surveys in the series.

Totals from these sources were distributed by field, function, etc., by computer, using summary distributions taken from respondent institutions of each type. The same system was used in those cases where institutions reported total values for particular items but were unable to give detailed breakdowns.

In some cases, institutions were able to complete some items on the questionnaire but unable to fill out others. To estimate for these, a system of ratios between key variables was de-

[2] Otis A. Singletary, *American Universities and Colleges*, 10th Edition (Washington, D.C. 20036; American Council on Education, 1968).

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Totals from these sources were distributed by field, function, etc., by computer, using summary distributions taken from respondent institutions of each type. The same system was used in those cases where institutions reported total values for particular items but were unable to give detailed breakdowns.

In some cases, institutions were able to complete some items on the questionnaire but unable to fill out others. To estimate for these, a system of ratios between key variables was devised. For example, if an institution reported the number of scientists and engineers, but was unable to give a figure for instruction and departmental research, the latter figure was estimated on the basis of teaching full-time equivalents (FTE's), at ratios which varied according to the type of institutions.

Nonseparately Budgeted R&D Expenditures

The figures published in the body of this report refer to all current expenditures for research and development in universities and colleges. Of the $2.9 billion total, separately budgeted R&D expenditures amounted to $2.4 billion, and departmental research and other R&D activities for which universities and colleges do not maintain separate records were estimated at $500 million. This amount includes funds allocated to departmental research by the various academic departments, as well as some indirect costs associated with R&D performance (cost-sharing).

In order to convert "current expenditures for separately budgeted research" into "total current R&D expenditures" and "current expenditures for instruction and departmental research" into "current expenditures for instruction," an estimated $500 million was subtracted from the latter figure and added to the former. This $500 million was distributed by field of science, character of work and cost item based on ratios established in this survey and earlier surveys. All nonseparately budgeted research and development was considered to be part of institutions' own funds.

Limitations

Since the universe for the survey consisted of all institutions of higher education known or believed to have engaged in scientific or engineering activities, the data presented in this report are not subject to a sampling error. However, some limitations must be taken into account stemming from unevenness of response rate, lack of agreement among respondents concerning survey definitions, and the inadequacy of accounting procedures utilized by some institutions.

The lack of agreement on the interpretation of survey definitions is perhaps the source of the major limitation to the interpretation of survey data, followed by the difficulty of measuring certain aspects of scientific and engineering activities. Estimates made by NSF staff members, being based where possible on the published records of the institutions in question, are believed to be accurate within a margin of 5 percent at aggregate levels. Similarly, as the biennial survey series closes its fourth cycle, the magnitude of the error attributable to the inadequacy of institutional recordkeeping procedures is constantly decreasing as more and more institutions, especially the larger ones, revise their procedures to yeild the information requested.

[2]Otis A. Singletary, *American Universities and Colleges*, 10th Edition (Washington, D.C. 20036; American Council on Education, 1968).

Table A-1. Number of universities and colleges included in the survey of scientific and engineering activities of institutions of higher education, by State and type of institution, 1971[a]

Division and State	Total	Institutions granting —				
		Doctorate		Master's	Bachelor's	No science degree
		Total[b]	Medical schools[c]			
United States, Total	2,198	252	105	287	726	933
New England	182	23	8	22	60	77
Maine	15	1	–	2	7	5
New Hampshire	15	2	1	1	8	4
Vermont	16	1	1	2	5	8
Massachusetts	88	12	3	10	28	38
Rhode Island	10	3	1	1	2	4
Connecticut	38	4	2	6	10	18
Middle Atlantic	331	52	21	61	109	109
New York	172	32	12	33	43	64
New Jersey	43	6	2	7	12	18
Pennsylvania	116	14	7	21	54	27
East North Central	335	39	15	35	132	129
Ohio	72	11	4	8	35	18
Indiana	39	5	1	6	25	3
Illinois	102	12	5	9	30	51
Michigan	72	7	3	7	21	37
Wisconsin	50	4	2	5	21	20
West North Central	248	17	11	24	104	103
Minnesota	45	1	1	8	12	24
Iowa	45	2	1	2	26	15
Missouri	56	4	4	5	22	25
North Dakota	12	2	1	–	5	5
South Dakota	15	3	1	–	10	2
Nebraska	27	3	2	5	11	8
Kansas	48	2	1	4	18	24
South Atlantic	373	31	17	29	133	180
Delaware	5	1	–	–	1	3
Maryland	39	2	2	1	15	21
District of Columbia	15	5	3	1	3	6
Virginia	48	4	2	7	16	21
West Virginia	21	1	1	1	15	4
North Carolina	93	4	3	6	32	51
South Carolina	39	3	1	3	18	15
Georgia	54	6	2	4	21	23
Florida	59	5	3	6	12	36
East South Central	171	14	7	22	63	72
Kentucky	28	2	2	5	14	7
Tennessee	53	6	3	7	24	16
Alabama	48	3	1	8	15	22
Mississippi	42	3	1	2	10	27
West South Central	191	28	10	34	54	75
Arkansas	18	1	1	3	11	3
Louisiana	24	5	2	7	7	5
Oklahoma	33	2	1	5	12	14
Texas	116	20	6	19	24	53
[illegible]	97	18	4	11	24	44

Illinois	102	12	5	9	30	51
Michigan	72	7	3	7	21	37
Wisconsin	50	4	2	5	21	20
West North Central	248	17	11	24	104	103
Minnesota	45	1	1	8	12	24
Iowa	45	2	1	2	26	15
Missouri	56	4	4	5	22	25
North Dakota	12	2	1	–	5	5
South Dakota	15	3	1	–	10	2
Nebraska	27	3	2	5	11	8
Kansas	48	2	1	4	18	24
South Atlantic	373	31	17	29	133	180
Delaware	5	1	–	–	1	3
Maryland	39	2	2	1	15	21
District of Columbia	15	5	3	1	3	6
Virginia	48	4	2	7	16	21
West Virginia	21	1	1	1	15	4
North Carolina	93	4	3	6	32	51
South Carolina	39	3	1	3	18	15
Georgia	54	6	2	4	21	23
Florida	59	5	3	6	12	36
East South Central	171	14	7	22	63	72
Kentucky	28	2	2	5	14	7
Tennessee	53	6	3	7	24	16
Alabama	48	3	1	8	15	22
Mississippi	42	3	1	2	10	27
West South Central	191	28	10	34	54	75
Arkansas	18	1	1	3	11	3
Louisiana	24	5	2	7	7	5
Oklahoma	33	2	1	5	12	14
Texas	116	20	6	19	24	53
Mountain	97	18	4	11	24	44
Montana	12	2	–	1	6	3
Idaho	10	1	–	1	4	4
Wyoming	7	1	–	–	–	6
Colorado	28	5	1	3	6	14
New Mexico	12	3	1	3	4	2
Arizona	15	2	1	1	2	10
Utah	10	3	1	1	2	4
Nevada	3	1	–	1	–	1
Pacific	260	27	11	49	42	142
Washington	37	2	1	10	3	22
Oregon	33	5	1	7	6	15
California	182	18	8	32	30	102
Alaska	3	1	–	–	1	1
Hawaii	5	1	1	–	2	2
Outlying areas	10	3	1	–	5	2

[a]Excludes about 350 independent schools of music, art, theology, law, and other specialized institutions that do not conduct science or engineering programs. Also excludes 36 university-administered FFRDC's, which are listed in appendix D.

[b]The number of doctorate-granting institutions shown here may differ from similar figures published elsewhere for the following principal reasons: (1) Lack of uniformity in classifying branches, affiliates, or other organizational components of university systems; (2) differing definitions of science and engineering fields; and (3) variations in the time-span covered by the classification (e.g. single year or longer period).

[c]Includes three institutions granting M.D. degrees that do not grant Ph.D. or Sc.D. degrees in the sciences or engineering. However, they are included as doctorate-granting institutions for the purpose of treating all medical schools uniformly.

Table A-2. Number of universities and colleges included in the survey of scientific activities of institutions of higher education and number that responded, by type of institution, 1971

Type of institution	Number of surveyed universities and colleges	Respondents	
		Number	Percent of total
Total	2,198	1,577	71.7
Doctorate	252	218	86.5
Medical schools	105	96	91.4
Master's	287	238	82.9
Bachelor's	726	525	72.3
No science degree	933	596	63.9

Table A-3. Percent estimated for nonrespondents in scientific and engineering activities at universities and colleges, by type of institution, 1970 and January 1971[a]

(Percent)

Item	All universities and colleges	Institutions granting –				
		Doctorate		Master's	Bachelor's	No science degree
		Total	Medical schools			
Employment characteristics, January 1971:						
Scientists and engineers, total	20.8	18.5	18.0	17.2	26.4	30.7
Full-time scientists and engineers	19.7	17.4	16.4	16.4	25.5	30.8
Part-time scientists and engineers	25.5	23.7	21.8	21.6	31.6	30.5
Graduate students[b]	12.2	12.1	25.2	14.7	(c)	(c)
Technicians	33.7	34.2	41.7	21.3	37.1	29.0
Financial characteristics, 1970:						
Separately budgeted R&D expenditures	9.4	9.2	13.1	12.5	19.8	24.9
Federally financed separately budgeted R&D expenditures	8.9	8.6	14.4	18.9	28.8	36.6
Instruction and departmental research expenditures	24.6	18.8	26.4	28.0	42.8	44.4
Total capital expenditures	10.0	8.1	8.1	10.2	16.0	25.0
Federally financed capital expenditures	8.8	7.8	12.8	6.4	11.8	30.3

[a]Values were imputed to allow for nonresponse. For example, the imputed dollar volume of separately budgeted R&D expenditures of nonrespondent institutions amounted to $58 million, or 2.7 percent of the $2.1 billion universe total for all universities and colleges, both respondents and nonrespondents.

[b]Includes only those graduate students receiving stipends for part-time services as scientists and engineers.

[c]Not applicable.

Appendix B

Statistical Tables

Universities and colleges (Part I)

Scientific and Engineering Personnel

SCIENTISTS AND ENGINEERS:

B-1. Number of scientists and engineers employed in universities and colleges, by type of institution and employment status, January 1965, 1967, 1969, and 1971 27

B-2. Number of scientists and engineers employed in universities and colleges, by field and employment status, January 1965, 1967, 1969, and 1971 27

B-3. Number of scientists and engineers employed in universities and colleges, by field of employment, January 1965, 1967, 1969, and 1971 28

B-4. Number of scientists and engineers employed in universities and colleges, by function in which primarily employed, type of institution, and field of employment, January 1971 28

B-5. Number of scientists and engineers employed in universities and colleges, by detailed field of employment and type of institution, January 1971 . . . 29

B-6. Number of scientists and engineers employed in universities and colleges, by type of institution, level of educational attainment, and field of employment, January 1971 29

B-7. Number of scientists and engineers employed in universities and colleges, by State, January 1965, 1967, 1969, and 1971 30

B-8. Number of scientists and engineers employed in universities and colleges, by State and field of employment, January 1971 31

B-9. Number of scientists and engineers employed in universities and colleges, by State and level of educational attainment, January 1971 32

B-10. FTE scientists and engineers employed in universities and colleges, by State and function, January 1971 33

GRADUATE STUDENTS:

B-11. Graduate students receiving compensation for part-time services as scientists and engineers in universities and colleges, by field of employment and function, January 1965, 1967, 1969, and 1971 34

B-12. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by function, type of institution, and field, January 1971 34

B-13. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by State, January 1965, 1967, 1969, and 1971 35

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Scientific and Engineering Personnel

SCIENTISTS AND ENGINEERS:

B-1. Number of scientists and engineers employed in universities and colleges, by type of institution and employment status, January 1965, 1967, 1969, and 1971 27

B-2. Number of scientists and engineers employed in universities and colleges, by field and employment status, January 1965, 1967, 1969, and 1971 27

B-3. Number of scientists and engineers employed in universities and colleges, by field of employment, January 1965, 1967, 1969, and 1971 28

B-4. Number of scientists and engineers employed in universities and colleges, by function in which primarily employed, type of institution, and field of employment, January 1971 28

B-5. Number of scientists and engineers employed in universities and colleges, by detailed field of employment and type of institution, January 1971 . . . 29

B-6. Number of scientists and engineers employed in universities and colleges, by type of institution, level of educational attainment, and field of employment, January 1971 29

B-7. Number of scientists and engineers employed in universities and colleges, by State, January 1965, 1967, 1969, and 1971 30

B-8. Number of scientists and engineers employed in universities and colleges, by State and field of employment, January 1971 31

B-9. Number of scientists and engineers employed in universities and colleges, by State and level of educational attainment, January 1971 32

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Table B-1. Number of scientists and engineers employed in univer of institution and employment status, January 1965, 196

Type of institution and employment status	1965	19
Total	178,904	21
Full time	142,713	170
Part time	36,191	4
Doctorate	118,233	14
Full time	94,570	114
Part time	23,663	28
Master's	21,078	24
Full time	17,434	20
Part time	3,644	3
Bachelor's	22,423	23
Full time	18,673	19
Part time	3,750	3
No science degree	17,170	22
Full time	12,036	16
Part time	5,134	6

[a]Type of institutions classifies institutions grouped by highest science or engi is used throughout the appendix tables.

Table B-2. Number of scientists and engineers employed in univer and employment status, January 1965, 1967, 196

Field and employment status	1965	19
Total	178,904	21
Full time	142,713	170
Part time	36,191	4
Engineers	21,681	25
Full time	18,117	20
Part time	3,564	4
Physical scientists	25,485	31
Full time	22,826	27
Part time	2,659	3
Mathematicians	13,680	17
Full time	10,998	14
Part time	2,682	3
Life scientists	75,775	87
Full time	57,135	66
Part time	18,640	20
Psychologists	9,430	11
Full time	6,929	8
Part time	2,501	2
Social scientists	32,853	39
Full time	26,708	32
Part time	6,145	7

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Table B-1. Number of scientists and engineers employed in universities and colleges, by type of institution and employment status, January 1965, 1967, 1969, and 1971

Type of institution and employment status	January			
	1965	1967	1969	1971
Total	178,904	212,855	246,183	273,775
Full time	142,713	170,557	199,630	223,055
Part time	36,191	42,298	46,553	50,720
Doctorate	118,233	142,676	159,007	176,372
Full time	94,570	114,446	128,672	144,946
Part time	23,663	28,230	30,335	31,426
Master's	21,078	24,729	33,211	33,897
Full time	17,434	20,748	28,595	28,991
Part time	3,644	3,981	4,616	4,906
Bachelor's	22,423	23,025	24,808	26,665
Full time	18,673	19,328	20,731	22,732
Part time	3,750	3,697	4,077	3,933
No science degree	17,170	22,425	29,157	36,841
Full time	12,036	16,035	21,632	26,386
Part time	5,134	6,390	7,525	10,455

[a]Type of institutions classifies institutions grouped by highest science or engineering degrees awarded. This term is used throughout the appendix tables.

Table B-2. Number of scientists and engineers employed in universities and colleges, by field and employment status, January 1965, 1967, 1969 and 1971

Field and employment status	January			
	1965	1967	1969	1971
Total	178,904	212,855	246,183	273,775
Full time	142,713	170,557	199,630	223,055
Part time	36,191	42,298	46,553	50,720
Engineers	21,681	25,253	25,387	27,130
Full time	18,117	20,983	21,431	23,039
Part time	3,564	4,270	3,956	4,091
Physical scientists	25,485	31,354	33,698	35,943
Full time	22,826	27,655	29,975	32,098
Part time	2,659	3,699	3,723	3,845
Mathematicians	13,680	17,776	22,495	24,548
Full time	10,998	14,397	18,390	20,282
Part time	2,682	3,379	4,105	4,266
Life scientists	75,775	87,347	97,206	110,274
Full time	57,135	66,620	74,882	85,907
Part time	18,640	20,727	22,324	24,367
Psychologists	9,430	11,358	14,780	16,806
Full time	6,929	8,554	11,536	12,994
Part time	2,501	2,804	3,244	3,812
Social scientists	32,853	39,767	52,617	59,074
Full time	26,708	32,348	43,416	48,735
Part time	6,145	7,419	9,201	10,339

Table B-3. Number of scientists and engineers employed in universities and colleges, by field of employment, January 1965, 1967, 1969, and 1971

Field of employment	January			
	1965	1967	1969	1971
Total	178,904	212,855	246,183	273,775
Engineers	21,681	25,253	25,387	27,130
Aeronautical	1,127	1,360	1,357	1,469
Chemical	1,571	1,565	1,735	1,843
Civil	3,145	3,660	3,894	4,129
Electrical	5,478	6,563	6,803	6,885
Mechanical	4,108	4,638	4,812	5,387
Other engineers	6,252	7,467	6,786	7,417
Physical scientists	25,485	31,354	33,698	35,943
Chemists	10,684	12,961	14,201	14,688
Earth scientists	4,005	5,111	5,549	6,500
Physicists	9,132	11,127	11,766	12,195
Other physical scientists	1,664	2,155	2,182	2,560
Mathematicians	13,680	17,776	22,495	24,548
Life scientists	75,775	87,347	97,206	110,274
Agricultural	13,507	14,950	15,150	18,039
Biological	24,281	27,419	29,257	31,808
Medical	37,987	44,978	52,799	60,427
Psychologists	9,430	11,358	14,780	16,806
Social scientists	32,853	39,767	52,617	59,074
Economists	7,932	9,662	10,402	11,263
Sociologists	6,261	7,558	9,451	11,323
Political scientists	5,919	7,190	7,919	8,938
Historians	(NA)	(NA)	14,427	15,871
Other social scientists	12,741	15,357	10,418	11,679

Note: Includes scientists and engineers employed fu. time and part time, but excludes graduate students receiving compensation for part-time services

Table B-4. Number of scientists and engineers employed in universities and colleges, by function in which primarily employed, type of institution, and field of employment, January 1971

Function and type of institution	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
All functions, total	273,775	27,130	35,943	24,548	110,274	16,806	59,074
Doctorate	176,372	18,991	20,155	10,132	94,295	7,016	25,783
Master's	33,897	2,552	6,016	4,581	5,157	3,557	12,034
Bachelor's	26,665	1,208	4,740	3,652	4,061	2,658	10,346
No science degree	36,841	4,379	5,032	6,183	6,761	3,575	10,911
Teaching	200,317	21,318	28,013	22,609	62,490	14,460	51,427
Doctorate	107,947	13,474	12,617	8,462	47,040	5,393	20,961
Master's	32,341	2,433	5,809	4,474	4,879	3,354	11,392
Bachelor's	25,430	1,165	4,631	3,589	3,940	2,529	9,576

Physicists	9,132	11,127	11,766	12,195
Other physical scientists	1,664	2,155	2,182	2,560
Mathematicians	13,680	17,776	22,495	24,548
Life scientists	75,775	87,347	97,206	110,274
Agricultural	13,507	14,950	15,150	18,039
Biological	24,281	27,419	29,257	31,808
Medical	37,987	44,978	52,799	60,427
Psychologists	9,430	11,358	14,780	16,806
Social scientists	32,853	39,767	52,617	59,074
Economists	7,932	9,662	10,402	11,263
Sociologists	6,261	7,558	9,451	11,323
Political scientists	5,919	7,190	7,919	8,938
Historians	(NA)	(NA)	14,427	15,871
Other social scientists	12,741	15,357	10,418	11,679

Note: Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-4. Number of scientists and engineers employed in universities and colleges, by function in which primarily employed, type of institution, and field of employment, January 1971

Function and type of institution	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
All functions, total	273,775	27,130	35,943	24,548	110,274	16,806	59,074
Doctorate	176,372	18,991	20,155	10,132	94,295	7,016	25,783
Master's	33,897	2,552	6,016	4,581	5,157	3,557	12,034
Bachelor's	26,665	1,208	4,740	3,652	4,061	2,658	10,346
No science degree	36,841	4,379	5,032	6,183	6,761	3,575	10,911
Teaching	200,317	21,318	28,013	22,609	62,490	14,460	51,427
Doctorate	107,947	13,474	12,617	8,462	47,040	5,393	20,961
Master's	32,341	2,433	5,809	4,474	4,879	3,354	11,392
Bachelor's	25,430	1,165	4,631	3,589	3,940	2,529	9,576
No science degree	34,599	4,246	4,956	6,084	6,631	3,184	9,498
Research and development	48,544	4,839	7,314	1,446	30,433	1,213	3,299
Doctorate	47,630	4,736	7,106	1,381	30,171	1,134	3,102
Master's	585	68	129	35	164	54	135
Bachelor's	244	21	65	21	74	16	47
No science degree	85	14	14	9	24	9	15
Other activities	24,914	973	616	493	17,351	1,133	4,348
Doctorate	20,795	781	432	289	17,084	489	1,720
Master's	971	51	78	72	114	149	507
Bachelor's	991	22	44	42	47	113	723
No science degree	2,157	119	62	90	106	382	1,398

Note: Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-5. Number of scientists and engineers employed in universities and colleges, by detailed field of employment and type of institution, January 1971

Field of employment	Total	Institutions granting — Doctorate	Master's	Bachelor's	No science degree
Total	273,775	176,372	33,897	26,665	36,841
Engineers	27,130	18,991	2,552	1,208	4,379
Aeronautical	1,469	1,169	98	83	119
Chemical	1,843	1,589	104	38	112
Civil	4,129	2,818	447	201	663
Electrical	6,885	4,518	662	328	1,377
Mechanical	5,387	3,367	590	320	1,110
Other engineers	7,417	5,530	651	238	998
Physical scientists	35,943	20,155	6,016	4,740	5,032
Chemists	14,688	7,391	2,548	2,480	2,269
Earth scientists	6,500	3,996	1,191	533	780
Physicists	12,195	7,072	1,943	1,634	1,546
Other physical scientists	2,560	1,696	334	93	437
Mathematicians	24,548	10,132	4,581	3,652	6,183
Life sciences	110,274	94,295	5,157	4,061	6,761
Agricultural	18,039	16,894	564	124	457
Biological	31,808	20,265	3,920	3,407	4,216
Medical	60,427	57,136	673	530	2,088
Psychologists	16,806	7,016	3,557	2,658	3,575
Social scientists	59,074	25,783	12,034	10,346	10,911
Economists	11,263	5,663	2,185	1,812	1,603
Sociologists	11,323	4,625	2,366	2,229	2,103
Political scientists	8,938	3,801	2,074	1,542	1,521
Historians	15,871	5,134	3,817	3,467	3,453
Other social scientists	11,679	6,560	1,592	1,296	2,231

Note: Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-6. Number of scientists and engineers employed in universities and colleges, by type of institution, level of educational attainment, and field of employment, January 1971

Type of institution and educational attainment	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
All institutional types	273,775	27,130	35,943	24,548	110,274	16,806	59,074
Ph.D.	123,474	13,321	24,259	10,252	36,022	10,627	28,993
M.D., D.D.S., etc.	46,529	72	134	69	45,639	212	403
Master's	78,939	9,122	9,100	12,427	16,903	5,279	26,108
Bachelor's	24,833	4,615	2,450	1,800	11,710	688	3,570
Doctorate-granting institutions	176,372	18,991	20,155	10,132	94,295	7,016	25,783
Ph.D.	87,447	11,665	16,034	7,016	29,780	5,749	17,203
M.D., D.D.S., etc.	44,940	52	69	15	44,500	120	184
Master's	27,430	5,129	2,555	2,416	9,954	816	6,560
Bachelor's	16,555	2,145	1,497	685	10,061	331	1,836
Master's-granting institutions	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Earth scientists	6,500	3,996	1,191	533	780
Physicists	12,195	7,072	1,943	1,634	1,546
Other physical scientists	2,560	1,696	334	93	437
Mathematicians	24,548	10,132	4,581	3,652	6,183
Life sciences	110,274	94,295	5,157	4,061	6,761
Agricultural	18,039	16,894	564	124	457
Biological	31,808	20,265	3,920	3,407	4,216
Medical	60,427	57,136	673	530	2,088
Psychologists	16,806	7,016	3,557	2,658	3,575
Social scientists	59,074	25,783	12,034	10,346	10,911
Economists	11,263	5,663	2,185	1,812	1,603
Sociologists	11,323	4,625	2,366	2,229	2,103
Political scientists	8,938	3,801	2,074	1,542	1,521
Historians	15,871	5,134	3,817	3,467	3,453
Other social scientists	11,679	6,560	1,592	1,296	2,231

Note. Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-6. Number of scientists and engineers employed in universities and colleges, by type of institution, level of educational attainment, and field of employment, January 1971

Type of institution and educational attainment	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
All institutional types	273,775	27,130	35,943	24,548	110,274	16,806	59,074
Ph.D.	123,474	13,321	24,259	10,252	36,022	10,627	28,993
M.D., D.D.S., etc.	46,529	72	134	69	45,639	212	403
Master's	78,939	9,122	9,100	12,427	16,903	5,279	26,108
Bachelor's	24,833	4,615	2,450	1,800	11,710	688	3,570
Doctorate-granting institutions	176,372	18,991	20,155	10,132	94,295	7,016	25,783
Ph.D.	87,447	11,665	16,034	7,016	29,780	5,749	17,203
M.D., D.D.S., etc.	44,940	52	69	15	44,500	120	184
Master's	27,430	5,129	2,555	2,416	9,954	816	6,560
Bachelor's	16,555	2,145	1,497	685	10,061	331	1,836
Master's-granting institutions	33,897	2,552	6,016	4,581	5,157	3,557	12,034
Ph.D.	19,324	1,109	4,265	1,877	3,322	2,538	6,213
M.D., D.D.S., etc.	248	9	11	19	143	28	38
Master's	12,469	1,074	1,450	2,430	1,353	889	5,273
Bachelor's	1,856	360	290	255	339	102	510
Bachelor's-granting institutions	26,665	1,208	4,740	3,652	4,061	2,658	10,346
Ph.D.	11,975	256	2,993	1,043	2,070	1,538	4,075
M.D., D.D.S., etc.	442	2	23	21	264	30	102
Master's	12,862	645	1,582	2,435	1,470	955	5,775
Bachelor's	1,386	305	142	153	257	135	394
Institutions not granting science degrees	36,841	4,379	5,032	6,183	6,761	3,575	10,911
Ph.D.	4,728	291	967	316	850	802	1,502
M.D., D.D.S., etc.	899	9	31	14	732	34	79
Master's	26,178	2,274	3,513	5,146	4,126	2,619	8,500
Bachelor's	5,036	1,805	521	707	1,053	120	830

Note: Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-7. Number of scientists and engineers employed in universities and colleges, by State, January 1965, 1967, 1969, and 1971

State	January			
	1965	1967	1969	1971
United States, total	178,904	212,855	246,183	273,775
New England	14,746	18,086	20,942	22,070
Maine	666	627	738	841
New Hampshire	707	805	979	927
Vermont	766	865	1,001	1,056
Massachusetts	8,686	11,290	12,742	13,181
Rhode Island	852	969	1,056	1,253
Connecticut	3,069	3,530	4,426	4,812
Middle Atlantic	36,947	44,368	51,110	56,538
New York	22,487	27,147	29,674	33,577
New Jersey	3,800	4,262	5,308	6,047
Pennsylvania	10,660	12,959	16,128	16,914
East North Central	31,637	37,952	43,723	48,875
Ohio	8,595	10,514	11,567	12,768
Indiana	3,790	3,979	4,570	5,353
Illinois	8,358	9,621	12,142	12,926
Michigan	7,059	8,431	8,379	9,591
Wisconsin	3,835	5,407	7,065	8,237
West North Central	13,641	17,126	20,027	23,013
Minnesota	3,444	3,861	4,185	4,947
Iowa	2,127	3,530	4,290	4,428
Missouri	3,498	4,159	5,427	6,456
North Dakota	649	823	902	877
South Dakota	682	821	778	822
Nebraska	1,235	1,384	1,500	2,259
Kansas	2,006	2,548	2,945	3,224
South Atlantic	24,784	28,064	34,353	37,909
Delaware	317	323	415	596
Maryland	4,842	5,501	6,631	7,227
District of Columbia	2,242	2,567	3,309	3,147
Virginia	2,813	3,181	4,052	4,898
West Virginia	1,175	1,456	1,688	1,731
North Carolina	5,432	5,257	6,442	6,823
South Carolina	1,305	1,832	2,164	2,450
Georgia	2,990	3,556	4,280	5,111
Florida	3,668	4,391	5,372	5,926
East South Central	8,584	10,105	11,708	12,893
Kentucky	2,009	2,363	2,687	2,846
Tennessee	2,986	3,368	4,103	4,535
Alabama	1,851	2,281	2,870	3,210
Mississippi	1,738	2,093	2,048	2,302
West South Central	13,906	16,487	19,238	20,963
Arkansas	1,314	1,604	1,710	1,899
Louisiana	3,117	3,435	3,904	4,363
Oklahoma	1,776	2,261	2,361	2,406
Texas	7,699	9,187	11,263	12,295
Mountain	7,538	9,004	10,504	12,081

East North Central	31,637	37,952	43,723	48,875
Ohio	8,595	10,514	11,567	12,768
Indiana	3,790	3,979	4,570	5,353
Illinois	8,358	9,621	12,142	12,926
Michigan	7,059	8,431	8,379	9,591
Wisconsin	3,835	5,407	7,065	8,237
West North Central	13,641	17,126	20,027	23,013
Minnesota	3,444	3,861	4,185	4,947
Iowa	2,127	3,530	4,290	4,428
Missouri	3,498	4,159	5,427	6,456
North Dakota	649	823	902	877
South Dakota	682	821	778	822
Nebraska	1,235	1,384	1,500	2,259
Kansas	2,006	2,548	2,945	3,224
South Atlantic	24,784	28,064	34,353	37,909
Delaware	317	323	415	596
Maryland	4,842	5,501	6,631	7,227
District of Columbia	2,242	2,567	3,309	3,147
Virginia	2,813	3,181	4,052	4,898
West Virginia	1,175	1,456	1,688	1,731
North Carolina	5,432	5,257	6,442	6,823
South Carolina	1,305	1,832	2,164	2,450
Georgia	2,990	3,556	4,280	5,111
Florida	3,668	4,391	5,372	5,926
East South Central	8,584	10,105	11,708	12,893
Kentucky	2,009	2,363	2,687	2,846
Tennessee	2,986	3,368	4,103	4,535
Alabama	1,851	2,281	2,870	3,210
Mississippi	1,738	2,093	2,048	2,302
West South Central	13,906	16,487	19,238	20,963
Arkansas	1,314	1,604	1,710	1,899
Louisiana	3,117	3,435	3,904	4,363
Oklahoma	1,776	2,261	2,361	2,406
Texas	7,699	9,187	11,263	12,295
Mountain	7,538	9,004	10,504	12,081
Montana	590	650	697	765
Idaho	634	667	842	897
Wyoming	317	317	404	456
Colorado	2,123	2,799	3,588	4,308
New Mexico	886	1,084	1,213	1,087
Arizona	1,484	1,633	1,839	2,242
Utah	1,205	1,555	1,601	1,969
Nevada	299	299	320	357
Pacific	25,858	30,219	32,754	37,492
Washington	2,888	3,405	3,936	4,977
Oregon	2,729	2,817	3,207	3,972
California	19,534	23,010	24,286	27,031
Alaska	211	226	283	284
Hawaii	496	761	1,042	1,228
Outlying Areas	1,263	1,444	1,824	1,941

Note. Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services

Table B-8. Number of scientists and engineers employed in universities and colleges, by State and field of employment, January 1971

State	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
United States, total	273,775	27,130	35,943	24,548	110,274	16,806	59,074
New England	22,070	2,977	3,339	1,725	8,205	1,323	4,501
Maine	841	90	132	95	219	58	247
New Hampshire	927	94	144	83	254	67	285
Vermont	1,056	81	113	78	494	59	231
Massachusetts	13,181	2,101	2,101	931	5,062	695	2,291
Rhode Island	1,253	164	225	150	319	94	301
Connecticut	4,812	447	624	388	1,857	350	1,146
Middle Atlantic	56,538	5,190	7,245	4,970	24,001	3,424	11,708
New York	33,577	2,923	3,983	2,861	14,820	1,953	7,037
New Jersey	6,047	773	1,010	754	1,371	519	1,620
Pennsylvania	16,914	1,494	2,252	1,355	7,810	952	3,051
East North Central	48,875	4,920	6,316	4,345	19,985	3,104	10,205
Ohio	12,768	1,205	1,359	901	6,651	597	2,055
Indiana	5,353	532	838	550	1,935	352	1,146
Illinois	12,926	1,128	1,599	1,263	5,402	885	2,649
Michigan	9,591	1,387	1,289	905	2,984	735	2,291
Wisconsin	8,237	668	1,231	726	3,013	535	2,064
West North Central	23,013	2,002	2,729	1,847	9,336	1,569	5,530
Minnesota	4,947	307	611	371	1,822	350	1,486
Iowa	4,428	467	444	351	1,664	268	1,234
Missouri	6,456	568	720	523	3,087	427	1,131
North Dakota	877	93	116	72	398	51	147
South Dakota	822	109	134	87	279	51	162
Nebraska	2,259	171	253	142	967	126	600
Kansas	3,224	287	451	301	1,119	296	770
South Atlantic	37,909	3,412	4,365	3,764	16,055	2,160	8,153
Delaware	596	90	90	73	136	53	154
Maryland	7,227	476	754	563	3,854	412	1,168
District of Columbia	3,147	296	286	350	1,216	192	807
Virginia	4,898	601	626	585	1,715	283	1,088
West Virginia	1,731	159	203	157	734	107	371
North Carolina	6,823	431	763	712	2,996	380	1,541
South Carolina	2,450	278	292	234	941	117	588
Georgia	5,111	443	624	465	2,088	272	1,219
Florida	5,926	638	727	625	2,375	344	1,217
East South Central	12,893	1,174	1,494	1,217	5,432	746	2,830
Kentucky	2,846	151	353	260	1,236	189	657
Tennessee	4,535	445	548	437	1,891	278	936
Alabama	3,210	388	348	311	1,330	173	660
Mississippi	2,302	190	245	209	975	106	577
West South Central	20,963	1,800	2,690	1,997	9,085	1,079	4,312
Arkansas	1,899	102	164	128	903	74	528
Louisiana	4,363	301	489	426	2,199	162	786
Oklahoma	2,406	215	340	213	954	145	539
Texas	12,295	1,182	1,697	1,230	5,029	698	2,459
Mountain	12,081	1,649	2,026	1,165	3,549	743	2,949
Montana	765	98	138	90	205	43	191
Idaho	897	102	126	85	374	44	166
Wyoming	456	77	76	59	127	25	92

Ohio	12,768	1,205	1,359	901	6,651	597	2,055
Indiana	5,353	532	838	550	1,935	352	1,146
Illinois	12,926	1,128	1,599	1,263	5,402	885	2,649
Michigan	9,591	1,387	1,289	905	2,984	735	2,291
Wisconsin	8,237	668	1,231	726	3,013	535	2,064
West North Central	23,013	2,002	2,729	1,847	9,336	1,569	5,530
Minnesota	4,947	307	611	371	1,822	350	1,486
Iowa	4,428	467	444	351	1,664	268	1,234
Missouri	6,456	568	720	523	3,087	427	1,131
North Dakota	877	93	116	72	398	51	147
South Dakota	822	109	134	87	279	51	162
Nebraska	2,259	171	253	142	967	126	600
Kansas	3,224	287	451	301	1,119	296	770
South Atlantic	37,909	3,412	4,365	3,764	16,055	2,160	8,153
Delaware	596	90	90	73	136	53	154
Maryland	7,227	476	754	563	3,854	412	1,168
District of Columbia	3,147	296	286	350	1,216	192	807
Virginia	4,898	601	626	585	1,715	283	1,088
West Virginia	1,731	159	203	157	734	107	371
North Carolina	6,823	431	763	712	2,996	380	1,541
South Carolina	2,450	278	292	234	941	117	588
Georgia	5,111	443	624	465	2,088	272	1,219
Florida	5,926	638	727	625	2,375	344	1,217
East South Central	12,893	1,174	1,494	1,217	5,432	746	2,830
Kentucky	2,846	151	353	260	1,236	189	657
Tennessee	4,535	445	548	437	1,891	278	936
Alabama	3,210	388	348	311	1,330	173	660
Mississippi	2,302	190	245	209	975	106	577
West South Central	20,963	1,800	2,690	1,997	9,085	1,079	4,312
Arkansas	1,899	102	164	128	903	74	528
Louisiana	4,363	301	489	426	2,199	162	786
Oklahoma	2,406	215	340	213	954	145	539
Texas	12,295	1,182	1,697	1,230	5,029	698	2,459
Mountain	12,081	1,649	2,026	1,165	3,549	743	2,949
Montana	765	98	138	90	205	43	191
Idaho	897	102	126	85	374	44	166
Wyoming	456	77	76	59	127	25	92
Colorado	4,308	621	639	410	1,104	243	1,291
New Mexico	1,087	166	205	137	280	66	233
Arizona	2,242	283	511	205	592	177	474
Utah	1,969	268	278	153	720	126	424
Nevada	357	34	53	26	147	19	78
Pacific	37,492	3,828	5,556	3,379	13,575	2,571	8,583
Washington	4,977	486	658	396	2,059	345	1,033
Oregon	3,972	199	500	344	1,941	278	710
California	27,031	3,024	4,143	2,558	8,938	1,865	6,503
Alaska	284	31	73	20	90	14	56
Hawaii	1,228	88	182	61	547	69	281
Outlying areas	1,941	178	183	139	1,051	87	303

Note: Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-9. Number of scientists and engineers employed in universities and colleges, by State and level of educational attainment, January 1971

State	Total	Ph. D	M.D., D.D.S., etc.	Master's	Bachelor's
United States, total	273,775	123,474	46,529	78,939	24,833
New England	22,070	10,236	3,879	5,470	2,485
Maine	841	432	15	318	76
New Hampshire	927	530	63	270	64
Vermont	1,056	417	133	327	179
Massachusetts	13,181	5,829	3,158	2,820	1,374
Rhode Island	1,253	769	50	358	76
Connecticut	4,812	2,259	460	1,377	716
Middle Atlantic	56,538	23,296	13,995	15,140	4,107
New York	33,577	13,222	9,109	8,662	2,584
New Jersey	6,047	2,820	389	2,277	561
Pennsylvania	16,914	7,254	4,497	4,201	962
East North Central	48,875	23,759	8,030	13,688	3,398
Ohio	12,768	6,223	3,051	2,790	704
Indiana	5,353	3,132	648	1,330	243
Illinois	12,926	6,080	1,879	3,816	1,151
Michigan	9,591	4,313	1,029	3,492	757
Wisconsin	8,237	4,011	1,423	2,260	543
West North Central	23,013	11,233	3,280	6,533	1,967
Minnesota	4,947	2,714	338	1,201	694
Iowa	4,428	2,114	474	1,432	408
Missouri	6,456	2,824	1,555	1,622	455
North Dakota	877	379	19	417	62
South Dakota	822	428	32	315	47
Nebraska	2,259	1,164	486	518	91
Kansas	3,224	1,610	376	1,028	210
South Atlantic	37,909	15,795	6,300	11,376	4,438
Delaware	596	376	2	146	72
Maryland	7,227	2,300	2,312	1,866	749
District of Columbia	3,147	1,405	819	748	175
Virginia	4,898	2,309	744	1,520	325
West Virginia	1,731	672	185	592	282
North Carolina	6,823	2,879	802	1,904	1,238
South Carolina	2,450	1,056	168	861	365
Georgia	5,111	2,315	641	1,435	720
Florida	5,926	2,483	627	2,304	512
East South Central	12,893	5,507	2,063	4,381	942
Kentucky	2,846	1,354	566	845	81
Tennessee	4,535	2,078	721	1,256	480
Alabama	3,210	1,217	549	1,218	226
Mississippi	2,302	858	227	1,062	155
West South Central	20,963	9,292	2,675	6,001	2,995
Arkansas	1,899	602	270	732	295
Louisiana	4,363	1,863	840	1,118	542
Oklahoma	2,406	1,316	308	693	89
Texas	12,295	5,511	1,257	3,458	2,069
Mountain	12,081	6,707	927	3,667	780

New York	33,577	13,222	9,109	8,662	2,584
New Jersey	6,047	2,820	389	2,277	561
Pennsylvania	16,914	7,254	4,497	4,201	962
East North Central	48,875	23,759	8,030	13,688	3,398
Ohio	12,768	6,223	3,051	2,790	704
Indiana	5,353	3,132	648	1,330	243
Illinois	12,926	6,080	1,879	3,816	1,151
Michigan	9,591	4,313	1,029	3,492	757
Wisconsin	8,237	4,011	1,423	2,260	543
West North Central	23,013	11,233	3,280	6,533	1,967
Minnesota	4,947	2,714	338	1,201	694
Iowa	4,428	2,114	474	1,432	408
Missouri	6,456	2,824	1,555	1,622	455
North Dakota	877	379	19	417	62
South Dakota	822	428	32	315	47
Nebraska	2,259	1,164	486	518	91
Kansas	3,224	1,610	376	1,028	210
South Atlantic	37,909	15,795	6,300	11,376	4,438
Delaware	596	376	2	146	72
Maryland	7,227	2,300	2,312	1,866	749
District of Columbia	3,147	1,405	819	748	175
Virginia	4,898	2,309	744	1,520	325
West Virginia	1,731	672	185	592	282
North Carolina	6,823	2,879	802	1,904	1,238
South Carolina	2,450	1,056	168	861	365
Georgia	5,111	2,315	641	1,435	720
Florida	5,926	2,483	627	2,304	512
East South Central	12,893	5,507	2,063	4,381	942
Kentucky	2,846	1,354	566	845	81
Tennessee	4,535	2,078	721	1,256	480
Alabama	3,210	1,217	549	1,218	226
Mississippi	2,302	858	227	1,062	155
West South Central	20,963	9,292	2,675	6,001	2,995
Arkansas	1,899	602	270	732	295
Louisiana	4,363	1,863	840	1,118	542
Oklahoma	2,406	1,316	308	693	89
Texas	12,295	5,511	1,257	3,458	2,069
Mountain	12,081	6,707	927	3,667	780
Montana	765	451	9	268	37
Idaho	897	514	14	315	54
Wyoming	456	281	10	142	23
Colorado	4,308	2,126	368	1,561	253
New Mexico	1,087	713	84	242	48
Arizona	2,242	1,292	120	605	225
Utah	1,969	1,137	263	462	107
Nevada	357	193	59	72	33
Pacific	37,492	17,195	5,028	11,846	3,423
Washington	4,977	1,797	987	1,757	436
Oregon	3,972	1,747	733	1,056	436
California	27,031	12,729	3,254	8,635	2,413
Alaska	284	189	0	76	19
Hawaii	1,228	733	54	322	119
Outlying areas	1,941	454	352	837	298

Note Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-10. FTE scientists and engineers employed in universities and colleges, by State and function, January 1971

State	Total	Function		
		Teaching	R&D	Other activities
United States, total	242,713	170,824	49,751	22,138
New England	19,742	13,718	5,352	672
Maine	813	662	94	57
New Hampshire	882	689	166	27
Vermont	1,003	733	167	103
Massachusetts	11,606	8,174	3,180	252
Rhode Island	1,205	834	300	71
Connecticut	4,233	2,626	1,445	162
Middle Atlantic	46,544	33,120	10,551	2,873
New York	28,029	18,923	7,295	1,811
New Jersey	5,091	4,181	804	106
Pennsylvania	13,424	10,016	2,452	956
East North Central	42,907	29,669	8,273	4,965
Ohio	11,281	7,195	2,145	1,941
Indiana	5,076	3,774	878	424
Illinois	11,061	7,555	2,086	1,420
Michigan	8,535	6,240	1,478	817
Wisconsin	6,954	4,905	1,686	363
West North Central	21,031	15,386	3,675	1,970
Minnesota	4,451	3,826	420	205
Iowa	4,248	2,708	883	657
Missouri	5,698	3,852	1,218	628
North Dakota	849	534	197	118
South Dakota	782	618	139	25
Nebraska	1,982	1,733	221	28
Kansas	3,021	2,115	597	309
South Atlantic	34,536	23,499	6,420	4,617
Delaware	542	407	101	34
Maryland	6,230	3,599	1,338	1,293
District of Columbia	2,415	1,664	450	301
Virginia	4,546	3,586	734	226
West Virginia	1,627	1,179	175	273
North Carolina	6,491	4,375	1,105	1,011
South Carolina	2,323	1,676	255	392
Georgia	4,786	3,191	1,005	590
Florida	5,576	3,822	1,257	497
East South Central	12,169	8,609	2,100	1,460
Kentucky	2,639	1,815	575	249
Tennessee	4,261	3,024	768	469
Alabama	3,051	2,283	418	350
Mississippi	2,218	1,487	339	392
West South Central	19,519	12,732	4,062	2,725
Arkansas	1,853	1,028	299	526
Louisiana	4,013	2,916	590	507
Oklahoma	2,293	1,564	381	348
Texas	11,360	7,224	2,792	1,344

New York	28,075	18,923	7,295	1,811
New Jersey	5,091	4,181	804	106
Pennsylvania	13,424	10,016	2,452	956
East North Central	42,907	29,669	8,273	4,965
Ohio	11,281	7,195	2,145	1,941
Indiana	5,076	3,774	878	424
Illinois	11,061	7,555	2,086	1,420
Michigan	8,535	6,240	1,478	817
Wisconsin	6,954	4,905	1,686	363
West North Central	21,031	15,386	3,675	1,970
Minnesota	4,451	3,826	420	205
Iowa	4,248	2,708	883	657
Missouri	5,698	3,852	1,218	628
North Dakota	849	534	197	118
South Dakota	782	618	139	25
Nebraska	1,982	1,733	221	28
Kansas	3,021	2,115	597	309
South Atlantic	34,536	23,499	6,420	4,617
Delaware	542	407	101	34
Maryland	6,230	3,599	1,338	1,293
District of Columbia	2,415	1,664	450	301
Virginia	4,546	3,586	734	226
West Virginia	1,627	1,179	175	273
North Carolina	6,491	4,375	1,105	1,011
South Carolina	2,323	1,676	255	392
Georgia	4,786	3,191	1,005	590
Florida	5,576	3,822	1,257	497
East South Central	12,169	8,609	2,100	1,460
Kentucky	2,639	1,815	575	249
Tennessee	4,261	3,024	768	469
Alabama	3,051	2,283	418	350
Mississippi	2,218	1,487	339	392
West South Central	19,519	12,732	4,062	2,725
Arkansas	1,853	1,028	299	526
Louisiana	4,013	2,916	590	507
Oklahoma	2,293	1,564	381	348
Texas	11,360	7,224	2,792	1,344
Mountain	11,462	8,136	2,426	900
Montana	748	616	119	13
Idaho	835	567	84	184
Wyoming	443	266	107	70
Colorado	4,139	3,340	693	106
New Mexico	1,044	784	209	51
Arizona	2,112	1,143	735	234
Utah	1,806	1,212	387	207
Nevada	335	208	92	35
Pacific	32,999	24,755	6,355	1,889
Washington	4,600	3,089	1,097	414
Oregon	3,660	2,517	926	217
California	23,349	18,268	3,942	1,139
Alaska	238	145	91	2
Hawaii	1,152	736	299	117
Outlying areas	1,804	1,200	537	67

Note. Includes scientists and engineers employed full time and part time, but excludes graduate students receiving compensation for part-time services.

Table B-11. Graduate students receiving compensation for part-time services as scientists and engineers in universities and colleges, by field of employment and function, January 1965, 1967, 1969, and 1971

Field of science and function	January			
	1965	1967	1969	1971
Total	58,384	71,777	84,099	94,261
Engineers	10,325	12,348	13,336	15,300
Physical scientists	17,675	20,293	23,109	24,433
Mathematicians	4,725	6,287	7,706	8,391
Life scientists	14,897	18,202	19,767	23,157
Psychologists	3,012	4,013	5,507	6,470
Social scientists	7,750	10,634	14,674	16,510
Teaching	29,570	37,124	44,645	52,281
Engineers	3,799	4,629	5,092	5,877
Physical scientists	9,194	10,539	11,982	13,507
Mathematicians	3,759	4,883	5,838	6,586
Life scientists	5,869	7,773	9,095	11,180
Psychologists	1,632	2,238	3,159	3,758
Social scientists	5,317	7,062	9,479	11,373
Research and development	27,208	32,299	36,213	38,393
Engineers	6,402	7,473	7,872	8,899
Physical scientists	8,103	9,317	10,627	10,471
Mathematicians	894	1,243	1,589	1,472
Life scientists	8,528	9,820	10,012	11,213
Psychologists	1,221	1,539	1,993	2,240
Social scientists	2,060	2,907	4,120	4,098
Other activities	1,606	2,354	3,241	3,587
Engineers	124	246	372	524
Physical scientists	378	437	500	455
Mathematicians	72	161	279	333
Life scientists	500	609	660	764
Psychologists	159	236	355	472
Social scientists	373	665	1,075	1,039

Table B-12. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by function, type of institution, and field, January 1971

Function and type	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists

Teaching	29,570	37,124	44,645	52,281
Engineers	3,799	4,629	5,092	5,877
Physical scientists	9,194	10,539	11,982	13,507
Mathematicians	3,759	4,883	5,838	6,586
Life scientists	5,869	7,773	9,095	11,180
Psychologists	1,632	2,238	3,159	3,758
Social scientists	5,317	7,062	9,479	11,373
Research and development	27,208	32,299	36,213	38,393
Engineers	6,402	7,473	7,872	8,899
Physical scientists	8,103	9,317	10,627	10,471
Mathematicians	894	1,243	1,589	1,472
Life scientists	8,528	9,820	10,012	11,213
Psychologists	1,221	1,539	1,993	2,240
Social scientists	2,060	2,907	4,120	4,098
Other activities	1,606	2,354	3,241	3,587
Engineers	124	246	372	524
Physical scientists	378	437	500	455
Mathematicians	72	161	279	333
Life scientists	500	609	660	764
Psychologists	159	236	355	472
Social scientists	373	665	1,075	1,039

Table B-12. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by function, type of institution, and field, January 1971

Function and type of institution	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
All functions, total	94,261	15,300	24,433	8,391	23,157	6,470	16,510
Doctorate	88,817	14,985	23,109	7,823	21,839	5,736	15,325
Master's	5,444	315	1,324	568	1,318	734	1,185
Teaching	52,281	5,877	13,507	6,586	11,180	3,758	11,373
Doctorate	48,144	5,668	12,438	6,078	10,160	3,250	10,550
Master's	4,137	209	1,069	508	1,020	508	823
Research and development	38,393	8,899	10,471	1,472	11,213	2,240	4,098
Doctorate	37,747	8,816	10,334	1,460	11,046	2,111	3,980
Master's	646	83	137	12	167	129	118
Other activities	3,587	524	455	333	764	472	1,039
Doctorate	2,926	501	337	285	633	375	795
Master's	661	23	118	48	131	97	244

Table B-13. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by State, January 1965, 1967, 1969, and 1971

State	January			
	1965	1967	1969	1971
United States, total	58,384	71,777	84,099	94,261
New England	5,384	6,370	7,475	8,755
Maine	115	144	163	261
New Hampshire	206	304	408	393
Vermont	110	147	164	218
Massachusetts	3,612	4,005	4,554	5,353
Rhode Island	495	599	690	728
Connecticut	846	1,171	1,496	1,802
Middle Atlantic	9,690	11,102	12,543	14,685
New York	5,264	6,107	6,943	8,275
New Jersey	1,202	1,277	1,454	1,291
Pennsylvania	3,224	3,718	4,146	5,119
East North Central	13,106	16,964	19,715	22,092
Ohio	2,737	3,552	4,006	4,776
Indiana	2,587	3,378	4,413	4,138
Illinois	3,702	4,512	4,787	5,833
Michigan	2,103	2,920	3,228	4,035
Wisconsin	1,977	2,602	3,281	3,310
West North Central	6,510	8,002	9,033	9,557
Minnesota	1,936	2,131	2,102	2,169
Iowa	1,371	1,658	2,160	2,270
Missouri	1,246	1,664	1,873	2,008
North Dakota	149	278	436	452
South Dakota	153	241	228	250
Nebraska	502	675	750	838
Kansas	1,153	1,355	1,484	1,570
South Atlantic	5,636	7,668	9,377	10,282
Delaware	391	452	467	493
Maryland	1,227	1,683	1,711	1,590
District of Columbia	456	686	760	836
Virginia	541	726	987	1,049
West Virginia	112	137	237	171
North Carolina	1,033	1,366	1,471	1,586
South Carolina	373	420	704	866
Georgia	571	759	1,203	1,917
Florida	932	1,439	1,837	1,774
East South Central	2,102	2,606	3,317	3,808
Kentucky	444	447	561	693
Tennessee	806	955	1,398	1,627
Alabama	524	633	744	725
Mississippi	328	571	614	763
West South Central	4,733	6,113	7,319	8,059
Arkansas	252	318	362	403
Louisiana	912	1,209	1,266	1,286
Oklahoma	1,059	1,161	1,125	1,158

Middle Atlantic	9,690	11,102	12,543	14,685
New York	5,264	6,107	6,943	8,275
New Jersey	1,202	1,277	1,454	1,291
Pennsylvania	3,224	3,718	4,146	5,119
East North Central	13,106	16,964	19,715	22,092
Ohio	2,737	3,552	4,006	4,776
Indiana	2,587	3,378	4,413	4,138
Illinois	3,702	4,512	4,787	5,833
Michigan	2,103	2,920	3,228	4,035
Wisconsin	1,977	2,602	3,281	3,310
West North Central	6,510	8,002	9,033	9,557
Minnesota	1,936	2,131	2,102	2,169
Iowa	1,371	1,658	2,160	2,270
Missouri	1,246	1,664	1,873	2,008
North Dakota	149	278	436	452
South Dakota	153	241	228	250
Nebraska	502	675	750	838
Kansas	1,153	1,355	1,484	1,570
South Atlantic	5,636	7,668	9,377	10,282
Delaware	391	452	467	493
Maryland	1,227	1,683	1,711	1,590
District of Columbia	456	686	760	836
Virginia	541	726	987	1,049
West Virginia	112	137	237	171
North Carolina	1,033	1,366	1,471	1,586
South Carolina	373	420	704	866
Georgia	571	759	1,203	1,917
Florida	932	1,439	1,837	1,774
East South Central	2,102	2,606	3,317	3,808
Kentucky	444	447	561	693
Tennessee	806	955	1,398	1,627
Alabama	524	633	744	725
Mississippi	328	571	614	763
West South Central	4,733	6,113	7,319	8,059
Arkansas	252	318	362	403
Louisiana	912	1,209	1,266	1,286
Oklahoma	1,059	1,161	1,125	1,158
Texas	2,510	3,425	4,566	5,212
Mountain	3,496	4,349	5,096	5,834
Montana	246	226	317	387
Idaho	138	202	178	169
Wyoming	62	193	246	312
Colorado	859	1,115	1,428	1,843
New Mexico	408	552	598	613
Arizona	952	1,028	1,146	1,219
Utah	729	892	1,001	1,082
Nevada	102	141	182	209
Pacific	7,647	8,518	10,121	11,009
Washington	1,295	1,585	1,733	1,761
Oregon	885	1,048	1,284	1,422
California	5,205	5,578	6,624	7,252
Alaska	67	50	72	72
Hawaii	195	257	408	502
Outlying Areas	80	85	103	180

Table B-14. Number of graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by State and field, January 1971

State	Total	Engineers	Physical scientists	Mathematicians	Life scientists	Psychologists	Social scientists
United States, total	94,261	15,300	24,433	8,391	23,157	6,470	16,510
New England	8,755	1,811	2,379	566	2,010	584	1,405
Maine	261	37	41	14	89	34	46
New Hampshire	393	60	117	45	91	32	48
Vermont	218	20	55	10	86	31	16
Massachusetts	5,353	1,333	1,428	332	1,308	337	615
Rhode Island	728	151	289	43	115	19	111
Connecticut	1,802	210	449	122	321	131	569
Middle Atlantic	14,685	2,786	4,419	1,225	2,880	1,077	2,298
New York	8,275	1,480	2,278	671	1,724	677	1,445
New Jersey	1,291	337	390	105	201	100	158
Pennsylvania	5,119	969	1,751	449	955	300	695
East North Central	22,092	3,354	5,668	2,278	5,210	1,518	4,064
Ohio	4,776	770	1,188	420	1,257	341	800
Indiana	4,138	686	927	458	1,044	227	796
Illinois	5,833	999	1,739	622	1,180	447	846
Michigan	4,035	517	874	432	1,072	306	834
Wisconsin	3,310	382	940	346	657	197	788
West North Central	9,557	1,159	1,859	758	3,108	689	1,984
Minnesota	2,169	300	361	140	729	122	517
Iowa	2,270	290	499	163	734	75	509
Missouri	2,008	285	363	217	614	120	409
North Dakota	452	43	112	16	193	37	51
South Dakota	250	68	45	10	91	8	28
Nebraska	838	38	148	81	286	55	230
Kansas	1,570	135	331	131	461	272	240
South Atlantic	10,282	1,345	2,571	866	3,021	601	1,878
Delaware	493	102	149	43	87	22	90
Maryland	1,590	137	421	158	474	95	305
District of Columbia	836	96	260	52	185	45	198
Virginia	1,049	197	222	48	394	33	155
West Virginia	171	6	35	6	107	7	10
North Carolina	1,586	176	346	205	466	87	306
South Carolina	866	140	184	119	217	71	135
Georgia	1,917	209	392	111	667	122	416
Florida	1,774	282	562	124	424	119	263
East South Central	3,808	487	766	354	1,243	351	607
Kentucky	693	25	197	88	201	63	119
Tennessee	1,627	236	361	139	444	220	227
Alabama	725	123	127	80	291	13	91
Mississippi	763	103	81	47	307	55	170
West South Central	8,059	1,391	1,963	837	1,895	527	1,446
Arkansas	403	45	114	32	123	24	65
Louisiana	1,286	143	340	138	389	75	201
Oklahoma	1,158	192	225	136	362	53	190
Texas	5,212	1,011	1,284	531	1,021	375	990

East North Central	22,092	3,354	5,668	2,278	5,210	1,518	4,064
Ohio	4,776	770	1,188	420	1,357	341	800
Indiana	4,138	686	927	458	1,044	227	796
Illinois	5,833	999	1,739	622	1,180	447	846
Michigan	4,035	517	874	432	1,072	306	834
Wisconsin	3,310	382	940	346	657	197	788
West North Central	9,557	1,159	1,859	758	3,108	689	1,984
Minnesota	2,169	300	361	140	729	122	517
Iowa	2,270	290	499	163	734	75	509
Missouri	2,008	285	363	217	614	120	409
North Dakota	452	43	112	16	193	37	51
South Dakota	250	68	45	10	91	8	28
Nebraska	838	38	148	81	286	55	230
Kansas	1,570	135	331	131	461	272	240
South Atlantic	10,282	1,345	2,571	866	3,021	601	1,878
Delaware	493	102	149	43	87	22	90
Maryland	1,590	137	421	158	474	95	305
District of Columbia	836	96	260	52	185	45	198
Virginia	1,049	197	222	48	394	33	155
West Virginia	171	6	35	6	107	7	10
North Carolina	1,586	176	346	205	466	87	306
South Carolina	866	140	184	119	217	71	135
Georgia	1,917	209	392	111	667	122	416
Florida	1,774	282	562	124	424	119	263
East South Central	3,808	487	766	354	1,243	351	607
Kentucky	693	25	197	88	201	63	119
Tennessee	1,627	236	361	139	444	220	227
Alabama	725	123	127	80	291	13	91
Mississippi	763	103	81	47	307	55	170
West South Central	8,059	1,391	1,963	837	1,895	527	1,446
Arkansas	403	45	114	32	123	24	65
Louisiana	1,286	143	340	138	389	75	201
Oklahoma	1,158	192	225	136	362	53	190
Texas	5,212	1,011	1,284	531	1,021	375	990
Mountain	5,834	889	1,619	554	1,247	494	1,031
Montana	387	49	90	37	122	34	55
Idaho	169	18	59	22	53	6	11
Wyoming	312	30	123	30	59	15	55
Colorado	1,843	350	482	159	334	125	393
New Mexico	613	96	192	78	90	54	103
Arizona	1,219	174	385	108	246	99	207
Utah	1,082	141	236	98	291	146	170
Nevada	209	31	52	22	52	15	37
Pacific	11,009	2,034	3,124	944	2,489	629	1,789
Washington	1,761	281	465	164	416	55	380
Oregon	1,422	82	463	137	410	141	189
California	7,252	1,606	2,039	621	1,492	400	1,094
Alaska	72	13	18	6	18	5	12
Hawaii	502	52	139	16	153	28	114
Outlying areas	180	44	65	9	54	0	8

Table B-15. Graduate students receiving compensation for part-time services as scientists or engineers in universities and colleges, by State and function, January 1971

State	Total number	Full-time equivalent			
		Total	Teaching	R&D	Other activities
United States, total	94,261	42,991	22,818	18,598	1,575
New England	8,755	3,908	1,838	1,928	142
Maine	261	130	75	55	0
New Hampshire	393	135	53	82	0
Vermont	218	96	61	35	0
Massachusetts	5,353	2,312	1,282	903	127
Rhode Island	728	352	177	169	6
Connecticut	1,802	883	190	684	9
Middle Atlantic	14,685	6,603	3,197	3,092	314
New York	8,275	3,560	1,805	1,621	134
New Jersey	1,291	635	352	281	2
Pennsylvania	5,119	2,408	1,040	1,190	178
East North Central	22,092	10,527	5,832	4,234	461
Ohio	4,776	2,632	1,585	876	171
Indiana	4,138	2,291	1,310	890	91
Illinois	5,833	2,697	1,238	1,345	114
Michigan	4,035	1,432	1,017	345	70
Wisconsin	3,310	1,475	682	778	15
West North Central	9,557	4,706	2,631	1,981	94
Minnesota	2,169	974	648	320	6
Iowa	2,270	1,120	550	539	31
Missouri	2,008	1,134	580	522	32
North Dakota	452	255	108	139	8
South Dakota	250	84	50	34	0
Nebraska	838	414	314	94	6
Kansas	1,570	725	381	333	11
South Atlantic	10,282	4,233	2,251	1,875	107
Delaware	493	302	100	202	0
Maryland	1,590	569	399	164	6
District of Columbia	836	466	290	150	26
Virginia	1,049	397	193	182	22
West Virginia	171	57	31	21	5
North Carolina	1,586	760	409	348	3
South Carolina	866	254	139	104	11
Georgia	1,917	652	350	286	16
Florida	1,774	776	340	418	18
East South Central	3,808	1,615	907	619	89
Kentucky	693	289	177	93	19
Tennessee	1,627	646	421	171	54
Alabama	725	319	173	145	1
Mississippi	763	361	136	210	15
West South Central	8,059	3,699	2,074	1,420	205
Arkansas	403	192	102	87	3
Louisiana	1,286	574	369	199	6
Oklahoma	1,158	[illegible]	323	208	34

New York	8,275	3,560	1,805	1,621	134
New Jersey	1,291	635	352	281	2
Pennsylvania	5,119	2,408	1,040	1,190	178
East North Central	22,092	10,527	5,832	4,234	461
Ohio	4,776	2,632	1,585	876	171
Indiana	4,138	2,291	1,310	890	91
Illinois	5,833	2,697	1,238	1,345	114
Michigan	4,035	1,432	1,017	345	70
Wisconsin	3,310	1,475	682	778	15
West North Central	9,557	4,706	2,631	1,981	94
Minnesota	2,169	974	648	320	6
Iowa	2,270	1,120	550	539	31
Missouri	2,008	1,134	580	522	32
North Dakota	452	255	108	139	8
South Dakota	250	84	50	34	0
Nebraska	838	414	314	94	6
Kansas	1,570	725	381	333	11
South Atlantic	10,282	4,233	2,251	1,875	107
Delaware	493	302	100	202	0
Maryland	1,590	569	399	164	6
District of Columbia	836	466	290	150	26
Virginia	1,049	397	193	182	22
West Virginia	171	57	31	21	5
North Carolina	1,586	760	409	348	3
South Carolina	866	254	139	104	11
Georgia	1,917	652	350	286	16
Florida	1,774	776	340	418	18
East South Central	3,808	1,615	907	619	89
Kentucky	693	289	177	93	19
Tennessee	1,627	646	421	171	54
Alabama	725	319	173	145	1
Mississippi	763	361	136	210	15
West South Central	8,059	3,699	2,074	1,420	205
Arkansas	403	192	102	87	3
Louisiana	1,286	574	369	199	6
Oklahoma	1,158	565	323	208	34
Texas	5,212	2,368	1,280	926	162
Mountain	5,834	2,552	1,449	1,010	93
Montana	387	160	110	50	0
Idaho	169	85	52	32	1
Wyoming	312	78	55	23	0
Colorado	1,843	697	346	339	12
New Mexico	613	309	205	79	25
Arizona	1,219	552	309	229	14
Utah	1,082	579	321	220	38
Nevada	209	92	51	38	3
Pacific	11,009	5,047	2,550	2,431	66
Washington	1,761	796	435	355	6
Oregon	1,422	521	231	278	12
California	7,252	3,451	1,724	1,685	42
Alaska	72	33	17	15	1
Hawaii	502	246	143	98	5
Outlying areas	180	101	89	8	4

Table B-16. Number of technicians employed in the sciences and engineering in universities and colleges, by function in which primarily employed, field of employment, and type of institution, January 1971

Function and field of employment	Total	Institutions granting —			
		Doctorate	Master's	Bachelor's	No science degree
All functions, total	46,013	42,723	1,358	593	1,339
Engineering and physical sciences	10,892	8 893	812	372	815
Life sciences	33,562	32,560	422	115	475
Social sciences	1,559	1,280	124	106	49
Research and development	31,909	31,358	393	58	100
Engineering and physical sciences	6,906	6,577	232	52	45
Life sciences	24,097	23,904	132	6	55
Social sciences	906	877	29	0	0
Other activities	14,104	11,365	965	535	1,239
Engineering and physical sciences	3,986	2,316	580	320	770
Life sciences	9,465	8,646	290	109	420
Social sciences	653	403	95	106	49

Table B-17. Number of technicians employed in the sciences and engineering in universities and colleges, by State and function in which primarily employed, January 1971

State	Total	Function	
		R&D	Other activities
United States, total	46,013	31,909	14,104
New England	3,564	3,090	474
Maine	55	47	8
New Hampshire	148	130	18
Vermont	69	13	56
Massachusetts	2,672	2,352	320
Rhode Island	158	135	23
Connecticut	462	413	49
Middle Atlantic	9,169	6,711	2,458
New York	6,118	4,204	1,914
New Jersey	736	550	186
Pennsylvania	2,315	1,957	358
East North Central	7,052	4,196	2,856
Ohio	2,051	1,276	775
Indiana	752	538	214
Illinois	2,254	1,048	1,206
Michigan	1,140	849	291
Wisconsin	855	485	370
West North Central	4,732	3,139	1,593
Minnesota	1,221	673	548
Iowa	502	365	137
Missouri	1,045	702	343
North Dakota	157	69	88
South Dakota	95	76	19
Nebraska	709	501	208
Kansas	1,003	753	250
South Atlantic	7,283	4,676	2,607
Delaware	27	10	17
Maryland	1,332	871	461
District of Columbia	418	211	207
Virginia	1,544	700	844
West Virginia	86	71	15
North Carolina	1,291	950	341
South Carolina	288	112	176
Georgia	1,133	872	261
Florida	1,164	879	285
East South Central	2,298	1,320	978
Kentucky	674	448	226
Tennessee	721	468	253
Alabama	461	314	147
Mississippi	442	90	352
West South Central	3,741	2,574	1,167
Arkansas	268	70	198
Louisiana	663	540	123
Oklahoma	290	133	157
Texas	2,520	1,831	689

New York	6,118	4,204	1,914
New Jersey	736	550	186
Pennsylvania	2,315	1,957	358
East North Central	7,052	4,196	2,856
Ohio	2,051	1,276	775
Indiana	752	538	214
Illinois	2,254	1,048	1,206
Michigan	1,140	849	291
Wisconsin	855	485	370
West North Central	4,732	3,139	1,593
Minnesota	1,221	673	548
Iowa	502	365	137
Missouri	1,045	702	343
North Dakota	157	69	88
South Dakota	95	76	19
Nebraska	709	501	208
Kansas	1,003	753	250
South Atlantic	7,283	4,676	2,607
Delaware	27	10	17
Maryland	1,332	871	461
District of Columbia	418	211	207
Virginia	1,544	700	844
West Virginia	86	71	15
North Carolina	1,291	950	341
South Carolina	288	112	176
Georgia	1,133	872	261
Florida	1,164	879	285
East South Central	2,298	1,320	978
Kentucky	674	448	226
Tennessee	721	468	253
Alabama	461	314	147
Mississippi	442	90	352
West South Central	3,741	2,574	1,167
Arkansas	268	70	198
Louisiana	663	540	123
Oklahoma	290	133	157
Texas	2,520	1,831	689
Mountain	1,825	1,463	362
Montana	127	101	26
Idaho	20	4	16
Wyoming	63	44	19
Colorado	550	482	68
New Mexico	278	221	57
Arizona	400	312	88
Utah	372	292	80
Nevada	15	7	8
Pacific	6,100	4,521	1,579
Washington	1,349	1,060	289
Oregon	552	315	237
California	3,911	2,915	996
Alaska	18	12	6
Hawaii	270	219	51
Outlying areas	249	219	30

Table B-18. Selected characteristics of current and capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, 1964, 1966, 1968, and 1970

Type of expenditure	1964	1966	1968	1970
Total	$3,959,170	$5,129,018	$6,957,279	$7,872,463
Current R&D expenditures	[a]1,594,895	[a]2,084,684	[a]2,598,708	2,856,427
Source of funds:				
Federal government	917,322	1,261,034	1,572,064	1,658,298
State governments	{173,154}	191,908	215,088	261,010
Local governments		11,718	10,387	11,931
Foundations	{61,411}	53,494	71,625	75,809
Voluntary health agencies		23,017	23,639	36,067
Industry	40,363	42,242	55,253	61,633
Institutions' own funds	381,346	469,636	614,530	696,747
Other sources	21,299	31,635	36,122	54,932
Character of work:				
Basic research	1,260,914	1,601,312	2,011,207	2,185,657
Applied research	293,377	400,078	492,047	526,576
Development	40,604	83,294	95,459	144,194
Field of science[b]	1,554,291	2,001,390	2,503,259	2,712,233
Engineering	198,768	280,363	333,968	346,427
Physical sciences	256,145	332,683	363,498	368,789
Environmental sciences[c]	63,127	76,485	135,363	130,277
Mathematics	48,246	61,205	79,118	102,444
Life sciences	794,967	981,113	1,169,390	1,311,366
Psychology	43,985	55,487	77,464	79,532
Social sciences[d]	125,351	168,294	247,085	272,982
Other sciences, NEC	23,702	45,760	97,353	100,416
Current expenditures for instruction[e]	1,834,783	2,377,337	3,287,844	4,064,163
Capital expenditures for research, development, and instruction	529,492	666,997	1,070,727	951,873
Federal government	134,439	212,397	340,447	279,316
Other sources	395,053	454,600	730,280	672,557

[a]Includes estimates for departmental research and for other R&D costs for which most universities and colleges do not maintain separate records.

[b]Excludes development expenditures not requested by field of science.

[c]The term, earth sciences, was used in 1964 and 1966 rather than environmental sciences.

[d]Includes anthropology; economics; history; linguistics; political science, sociology; and social sciences, NEC.

[e]Excludes departmental research expenditures, which are included with current R&D expenditures in this table.

SOURCE: National Science Foundation. Data derived from the 1964, 1966, 1969, and 1971 Surveys of Scientific Activities of Institutions of Higher Education.

Table B-19. Current and capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by type of expenditure and type of control, 1964, 1966, 1968, and 1970

[Dollars in thousands]

Type of expenditure	1964	1966	1968	1970
	All institutions			

Development	40,604	83,294	95,459	144,194
Field of science[b]	1,554,291	2,001,390	2,503,259	2,712,233
Engineering	198,768	280,363	333,988	346,427
Physical sciences	256,145	332,683	363,498	368,789
Environmental sciences[c]	63,127	76,485	135,363	130,277
Mathematics	48,246	61,205	79,118	102,444
Life sciences	794,967	981,113	1,169,390	1,311,366
Psychology	43,985	55,487	77,464	79,532
Social sciences[d]	125,351	168,294	247,085	272,982
Other sciences, NEC	23,702	45,760	97,353	100,416
Current expenditures for instruction[e]	1,834,783	2,377,337	3,287,844	4,064,163
Capital expenditures for research, development, and instruction	529,492	666,997	1,070,727	951,873
Federal government	134,439	212,397	340,447	279,316
Other sources	395,053	454,600	730,280	672,557

[a]Includes estimates for departmental research and for other R&D costs for which most universities and colleges do not maintain separate records.

[b]Excludes development expenditures not requested by field of science.

[c]The term, earth sciences, was used in 1964 and 1966 rather than environmental sciences.

[d]Includes anthropology; economics; history; linguistics; political science, sociology; and social sciences, NEC.

[e]Excludes departmental research expenditures, which are included with current R&D expenditures in this table.

SOURCE: National Science Foundation. Data derived from the 1964, 1966, 1969, and 1971 Surveys of Scientific Activities of Institutions of Higher Education.

Table B-19. Current and capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by type of expenditure and type of control, 1964, 1966, 1968, and 1970

(Dollars in thousands)

Type of expenditure	1964	1966	1968	1970
	All institutions			
Total	$3,959,170	$5,129,018	$6,957,279	$7,872,463
Current R&D expenditures	1,594,895	2,084,684	2,598,708	2,856,427
Current expenditures for instruction	1,834,783	2,377,337	3,287,844	4,064,163
Capital expenditures	529,492	666,997	1,070,727	951,873
	Public institutions			
Total	2,403,518	3,172,392	4,292,477	5,063,548
Current R&D expenditures	898,455	1,192,116	1,497,885	1,723,683
Current expenditures for instruction	1,184,151	1,533,915	2,120,425	2,676,814
Capital expenditures	320,912	446,361	674,167	663,051
	Private institutions			
Total	1,555,652	1,956,626	2,664,802	2,808,915
Current R&D expenditures	696,440	892,568	1,100,823	1,132,744
Current expenditures for instruction	650,632	843,422	1,167,419	1,387,349
Capital expenditures	208,580	220,636	396,560	288,822

Table B-20. Current and capital expenditures for research and instruction in the sciences and engineering in universities and colleges, by type of expenditure, field of science, and type of control, 1970

[Dollars in thousands]

Type of expenditure	Total	Engineering	Physical and environmental sciences	Mathematics	Life sciences	Psychology	Social sciences	Other sciences, n.e.c.
	All institutions							
Total	$7,728,269	$991,878	$1,346,376	$507,253	$3,016,512	$329,688	$1,274,141	$262,421
Current research expenditures	2,712,233	346,427	499,066	102,444	1,311,366	79,532	272,982	100,416
Current expenditures for instruction	4,064,163	512,828	622,042	366,649	1,286,674	228,120	939,110	108,740
Capital expenditures	951,873	132,623	225,268	38,160	418,472	22,036	62,049	53,265
R&D and graduate instruction	505,885	53,348	103,703	14,481	291,648	7,120	18,601	16,984
Undergraduate	445,988	79,275	121,565	23,679	126,824	14,916	43,448	36,281
	Public institutions							
Total	4,975,586	625,572	822,204	337,965	1,949,217	216,073	847,478	177,077
Current research expenditures	1,635,721	193,280	273,877	65,044	809,702	51,910	178,686	63,222
Current expenditures for instruction	2,676,814	349,830	401,533	248,239	831,831	149,887	623,880	71,614
Capital expenditures	663,051	82,462	146,794	24,682	307,684	14,276	44,912	42,241
R&D and graduate instruction	348,497	27,577	69,104	9,238	212,170	5,088	12,459	12,861
Undergraduate	314,554	54,885	77,690	15,444	95,514	9,188	32,453	29,380
	Private institutions							
Total	2,752,683	366,306	524,172	169,288	1,067,295	113,615	426,663	85,344
Current research expenditures	1,076,512	153,147	225,189	37,400	501,664	27,622	94,296	37,194
Current expenditures for instruction	1,387,349	162,998	220,509	118,410	454,843	78,233	315,230	37,126
Capital expenditures	288,822	50,161	78,474	13,478	110,788	7,760	17,137	11,024
R&D and graduate instruction	157,388	25,771	34,599	5,243	79,478	2,032	6,142	4,123
Undergraduate	131,434	24,390	43,875	8,235	31,310	5,728	10,995	6,901

Table B-21. Current expenditures for research and development in universities and colleges, by source of funds, 1953-70[a]

[Dollars in millions]

Year[b]	Total R&D performance	Source of funds: Federal Government	State and local governments	Industry	Other nonprofit institutions	Universities' and colleges' own funds[c]
1953[d]	$ 334	$ 138	$ 49	$19	$ 26	$103
1954	377	160	55	22	28	112
1955[d]	409	1[illegible]	62	25	30	123
1956[d]	480	213	70	29	34	134
1957[d]	531	229	80	34	38	150
1958	592	254	90	39	42	167
1959[d]	682	306	100	39	47	190
1960[d]	825	405	112	40	52	216

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instruction	505,885	53,348	103,703	14,481	291,648	7,120	18,601	16,984
Undergraduate	445,988	79,275	121,565	23,679	126,824	14,916	43,448	36,281
	Public institutions							
Total	4,975,586	625,572	822,204	337,965	1,949,217	216,073	847,478	177,077
Current research expenditures	1,635,721	193,280	273,877	65,044	809,702	51,910	178,686	63,222
Current expenditures for instruction	2,676,814	349,830	401,533	248,239	831,831	149,887	623,880	71,614
Capital expenditures	663,051	82,462	146,794	24,682	307,684	14,276	44,912	42,241
R&D and graduate instruction	348,497	27,577	69,104	9,238	212,170	5,088	12,459	12,861
Undergraduate	314,554	54,885	77,690	15,444	95,514	9,188	32,453	29,380
	Private institutions							
Total	2,752,683	366,306	524,172	169,288	1,067,295	113,615	426,663	85,344
Current research expenditures	1,076,512	153,147	225,189	37,400	501,664	27,622	94,296	37,194
Current expenditures for instruction	1,387,349	162,998	220,509	118,410	454,843	78,233	315,230	37,126
Capital expenditures	288,822	50,161	78,474	13,478	110,788	7,760	17,137	11,024
R&D and graduate instruction	157,388	25,771	34,599	5,243	79,478	2,032	6,142	4,123
Undergraduate	131,434	24,390	43,875	8,235	31,310	5,728	10,995	6,901

Table B-21. Current expenditures for research and development in universities and colleges, by source of funds, 1953-70[d]

[Dollars in millions]

Year[b]	Total R&D performance	Source of funds: Federal Government	State and local governments	Industry	Other nonprofit institutions	Universities' and colleges' own funds[c]
1953[d]	$ 334	$ 138	$ 49	$19	$ 26	$103
1954	377	160	55	22	28	112
1955[d]	409	169	62	25	30	123
1956[d]	480	213	70	29	34	134
1957[d]	531	229	80	34	38	150
1958	592	254	90	39	42	167
1959[d]	682	306	100	39	47	190
1960[d]	825	405	112	40	52	216
1961[d]	969	500	125	40	58	246
1962[d]	1,143	613	139	40	66	285
1963[d]	1,359	760	155	41	73	330
1964	1,595	917	173	41	83	382
1965[d]	1,822	1,073	188	41	93	427
1966	2,085	1,261	204	42	108	470
1967[d]	2,329	1,409	214	48	119	539
1968	2,599	1,572	225	55	131	615
1969[d]	2,705	1,600	245	60	145	655
1970	2,856	1,658	273	62	166	697

[a]Based on data obtained in NSF surveys covering R&D financing in 1954, 1958, 1964, 1966, 1968, and 1970.

[b]Academic year ending in the year shown; for example, 1953 refers to "academic year 1952-53."

[c]Includes estimates for departmental research and for other research activities for which most universities and colleges do not maintain separate records.

[d]Estimates derived from related information; no sector survey took place this year.

Table B-22. Current expenditures for research and development in universities and colleges, by character of work, 1953-70[a]

[Dollars in millions]

Year[b]	Total	Basic research		Applied research		Development	
		Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
1953[c]	$ 334	$ 173	51.8	$146	43.7	$ 15	4.5
1954	377	206	54.6	154	40.8	17	4.5
1955[c]	409	237	57.9	155	37.9	17	4.2
1956[c]	480	286	59.6	169	35.2	25	5.2
1957[c]	531	337	63.5	169	31.8	25	4.7
1958	592	390	65.9	175	29.6	27	4.6
1959[c]	682	468	68.6	186	27.3	28	4.1
1960[c]	825	576	69.8	215	26.1	34	4.1
1961[c]	969	701	72.3	233	24.0	35	3.6
1962[c]	1,143	850	74.4	253	22.1	40	3.5
1963[c]	1,359	1,036	76.2	283	20.8	40	2.9
1964	1,595	1,261	79.1	294	18.4	40	2.5
1965[c]	1,822	1,419	77.9	346	19.0	57	3.1
1966	2,085	1,601	76.8	400	19.2	84	4.0
1967[c]	2,329	1,795	77.1	444	19.1	90	3.9
1968	2,599	2,011	77.4	492	18.9	95	3.7
1969[c]	2,705	2,087	77.2	501	18.5	117	4.3
1970	2,856	2,186	76.5	527	18.4	144	5.0

[a]Includes estimates for departmental research and for other research activities for which most universities and colleges do not maintain separate records.

[b]Academic year ending in the year shown; for example, 1953 refers to "academic year 1952-53."

[c]Estimates derived from related information; no sector survey took place this year.

Table B-23. Current expenditures from universities' and colleges' own funds for separately and nonseparately budgeted R&D, 1953-70[a]

Year[b]	Total	Separately budgeted	Nonseparately budgeted[c]
1953[d]	$103	$ 24	$ 79
1954	112	25	87
1955[d]	123	26	97
1956[d]	134	26	108
1957[d]	150	29	121
1958	167	31	136
1959[d]	190	34	156
1960[d]	216	37	179
1961[d]	246	40	206
1962[d]	285	46	239
1963[d]	330	52	278
1964	382	59	323
1965[d]	427	79	348
1966	470	100	370
1967[d]	539	131	408
1968	615	165	450
1969[d]	655	180	475
1970	697	197	500

[a]Based on data obtained in NSF surveys covering R&D financing in 1954, 1958, 1964, 1966, 1968, and 1970.

[b]Academic year ending in the year shown; for example, 1953 refers to "academic year 1952-53."

[c]Includes estimates for departmental research and for other research activities for which most universities and

1969[c]	2,705	2,087	77.2	501	18.5	117	4.3
1970	2,856	2,186	76.5	527	18.4	144	5.0

[a]Includes estimates for departmental research and for other research activities for which most universities and colleges do not maintain separate records.

[b]Academic year ending in the year shown; for example, 1953 refers to "academic year 1952-53."

[c]Estimates derived from related information; no sector survey took place this year.

Table B-23. Current expenditures from universities' and colleges' own funds for separately and nonseparately budgeted R&D, 1953-70[a]

Year[b]	Total	Separately budgeted	Nonseparately budgeted[c]
1953[d]	$103	$ 24	$ 79
1954	112	25	87
1955[d]	123	26	97
1956[d]	134	26	108
1957[d]	150	29	121
1958	167	31	136
1959[d]	190	34	156
1960[d]	216	37	179
1961[d]	246	40	206
1962[d]	285	46	239
1963[d]	330	52	278
1964	382	59	323
1965[d]	427	79	348
1966	470	100	370
1967[d]	539	131	408
1968	615	165	450
1969[d]	655	180	475
1970	697	197	500

[a]Based on data obtained in NSF surveys covering R&D financing in 1954, 1958, 1964, 1966, 1968, and 1970.

[b]Academic year ending in the year shown; for example, 1953 refers to "academic year 1952-53."

[c]Includes estimates for departmental research and for other research activities for which most universities and colleges do not maintain separate records.

[d]Estimates derived from related information; no sector survey took place this year.

Table B-24. Current expenditures for research and development in universities and colleges, by source of funds and type of institution, 1970

[Dollars in thousands]

Source of funds	Total	Institutions granting —			
		Doctorate	Master's	Bachelor's	No science degree
Total	$2,856,427	$2,750,806	$78,046	$19,843	$7,732
Federal Government	1,658,298	1,626,074	21,831	7,036	3,357
State governments	261,010	256,744	3,203	910	153
Local governments	11,931	11,489	396	23	23
Foundations	75,809	72,269	2,237	898	405
Voluntary health agencies	36,067	35,958	99	10	0
Industry	61,633	59,574	1,651	305	103
Institution's own funds	696,747	634,468	48,174	10,430	3,675
Other sources	54,932	54,230	455	231	16

Table B-25. Current expenditures for research and development in universities and colleges, by State and source of funds, 1970

[Dollars in thousands]

State	Total	Federal Government	State governments	Local governments	Foundations	Voluntary health agencies	Industry	Institutions' own funds	Other sources
United States, total	$2,856,427	$1,658,298	$261,010	$11,931	$75,809	$36,067	$61,633	$696,747	$54,932
New England	335,640	235,027	7,446	172	13,833	7,390	5,258	61,069	5,445
Maine	4,615	1,567	1,061	0	17	1	247	1,720	2
New Hampshire	11,135	7,493	445	0	269	65	219	2,576	68
Vermont	6,870	3,861	696	0	98	47	81	2,007	80
Massachusetts	236,169	173,829	3,455	153	12,266	1,497	4,533	35,498	4,938
Rhode Island	14,668	8,699	1,257	1	229	103	30	4,281	68
Connecticut	62,183	39,578	532	18	954	5,677	148	14,987	289
Middle Atlantic	543,238	323,441	16,205	8,377	16,757	10,035	14,588	145,010	8,825
New York	324,550	202,582	9,918	7,667	11,042	8,103	6,884	72,541	5,813
New Jersey	54,925	31,311	859	0	1,428	80	1,133	18,976	1,138
Pennsylvania	163,763	89,548	5,428	710	4,287	1,852	6,571	53,493	1,874
East North Central	485,627	265,824	40,832	823	14,759	5,621	12,695	133,886	11,187
Ohio	92,761	50,310	9,117	265	1,478	1,209	2,778	24,888	2,716
Indiana	60,936	33,375	1,559	33	1,477	831	1,791	21,121	749
Illinois	132,267	77,250	12,210	209	5,766	1,470	1,031	33,440	891
Michigan	110,057	65,018	3,217	314	4,170	1,101	4,590	27,831	3,816
Wisconsin	89,606	39,871	14,729	2	1,868	1,010	2,505	26,606	3,015
West North Central	237,646	118,856	27,460	233	3,192	1,095	4,589	75,157	7,064
Minnesota	49,839	27,848	3,427	0	1,826	7	952	13,831	1,948
Iowa	36,467	17,166	4,115	70	222	413	966	13,377	138
Missouri	76,585	43,682	5,919	47	530	218	1,458	20,802	3,929
North Dakota	6,688	1,839	1,965	0	184	21	137	2,264	278
South Dakota	11,008	3,643	5,372	24	18	8	317	1,405	221
Nebraska	22,330	6,625	159	25	278	116	323	14,667	137
Kansas	34,729	18,053	6,503	67	134	312	436	8,811	413
South Atlantic	341,391	190,141	37,819	522	7,341	3,425	7,464	87,318	7,361
Delaware	6,503	2,914	587	0	508	0	347	2,099	48
Maryland	59,600	42,044	4,957	121	1,384	634	1,133	7,730	1,597
District of Columbia	30,695	20,629	71	108	905	160	707	6,647	1,468
Virginia	32,552	17,832	4,635	18	793	320	1,124	7,376	454
West Virginia	12,335	5,823	1,631	0	67	107	80	4,473	154
North Carolina	68,019	42,403	10,104	23	1,822	825	1,017	11,091	734
South Carolina	12,715	4,631	3,595	18	189	23	284	3,961	14
Georgia	54,982	25,231	9,155	208	593	524	1,745	15,745	1,781
Florida	63,990	28,634	3,084	26	1,080	832	1,027	28,196	1,111
East South Central	101,408	55,644	8,865	939	1,827	1,794	2,323	28,923	1,093
Kentucky	20,171	9,996	1,553	500	537	638	561	6,317	69
Tennessee	37,814	23,119	503	51	856	823	744	10,951	767
Alabama	25,315	13,385	4,433	19	251	161	422	6,532	112
Mississippi	18,108	9,144	2,376	369	183	172	596	5,123	145
West South Central	201,054	96,446	43,524	252	5,314	1,889	4,304	45,790	3,535
Arkansas	10,780	4,609	3,792	0	75	71	277	1,902	54
Louisiana	41,745	21,248	10,337	115	1,114	838	622	6,727	744
Oklahoma	22,551	8,747	4,564	17	112	87	550	7,921	553
Texas	125,978	61,842	24,831	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

New York	324,550	202,582	9,918	7,667	11,042	8,103	6,884	72,541	5,813
New Jersey	54,925	31,311	859	0	1,428	80	1,133	18,976	1,138
Pennsylvania	163,763	89,548	5,428	710	4,287	1,852	6,571	53,493	1,874
East North Central	485,627	265,824	40,832	823	14,759	5,621	12,695	133,886	11,187
Ohio	92,761	50,310	9,117	265	1,478	1,209	2,778	24,888	2,716
Indiana	60,936	33,375	1,559	33	1,477	831	1,791	21,121	749
Illinois	132,267	77,250	12,210	209	5,766	1,470	1,031	33,440	891
Michigan	110,057	65,018	3,217	314	4,170	1,101	4,590	27,831	3,816
Wisconsin	89,606	39,871	14,729	2	1,868	1,010	2,505	26,606	3,015
West North Central	237,646	118,856	27,460	233	3,192	1,095	4,589	75,157	7,064
Minnesota	49,839	27,848	3,427	0	1,826	7	952	13,831	1,948
Iowa	36,467	17,166	4,115	70	222	413	966	13,377	138
Missouri	76,585	43,682	5,919	47	530	218	1,458	20,802	3,929
North Dakota	6,688	1,839	1,965	0	184	21	137	2,264	278
South Dakota	11,008	3,643	5,372	24	18	8	317	1,405	221
Nebraska	22,330	6,625	159	25	278	116	323	14,667	137
Kansas	34,729	18,053	6,503	67	134	312	436	8,811	413
South Atlantic	341,391	190,141	37,819	522	7,341	3,425	7,464	87,318	7,361
Delaware	6,503	2,914	587	0	508	0	347	2,099	48
Maryland	59,600	42,044	4,957	121	1,384	634	1,133	7,730	1,597
District of Columbia	30,695	20,629	71	108	905	160	707	6,647	1,468
Virginia	32,552	17,832	4,635	18	793	320	1,124	7,376	454
West Virginia	12,335	5,823	1,631	0	67	107	80	4,473	154
North Carolina	68,019	42,403	10,104	23	1,822	825	1,017	11,091	734
South Carolina	12,715	4,631	3,595	18	189	23	284	3,961	14
Georgia	54,982	25,231	9,155	208	593	524	1,745	15,745	1,781
Florida	63,990	28,634	3,084	26	1,080	832	1,027	28,196	1,111
East South Central	101,408	55,644	8,865	939	1,827	1,794	2,323	28,923	1,093
Kentucky	20,171	9,996	1,553	500	537	638	561	6,317	69
Tennessee	37,814	23,119	503	51	856	823	744	10,951	767
Alabama	25,315	13,385	4,433	19	251	161	422	6,532	112
Mississippi	18,108	9,144	2,376	369	183	172	596	5,123	145
West South Central	201,054	96,446	43,524	252	5,314	1,889	4,304	45,790	3,535
Arkansas	10,780	4,609	3,792	0	75	71	277	1,902	54
Louisiana	41,745	21,248	10,337	115	1,114	838	622	6,727	744
Oklahoma	22,551	8,747	4,564	17	112	87	550	7,921	553
Texas	125,978	61,842	24,831	120	4,013	893	2,855	29,240	2,184
Mountain	158,630	96,822	21,825	193	1,262	1,291	5,829	28,105	3,303
Montana	10,992	4,656	3,412	0	38	6	232	2,556	92
Idaho	7,409	2,801	2,974	4	6	2	59	1,537	26
Wyoming	7,421	3,403	232	6	36	0	824	2,714	206
Colorado	58,414	41,027	3,478	76	613	816	2,960	8,676	768
New Mexico	21,523	16,885	1,246	41	1	347	1,086	1,713	204
Arizona	22,690	9,534	4,700	51	220	57	446	6,052	1,630
Utah	23,798	15,656	3,112	15	340	63	222	4,013	377
Nevada	6,383	2,860	2,671	0	8	0	0	844	0
Pacific	439,325	271,582	53,836	420	11,497	3,477	4,396	87,100	7,017
Washington	58,017	33,180	8,775	178	973	584	1,289	11,687	1,351
Oregon	37,002	21,789	4,205	5	1,429	507	604	7,454	1,009
California	314,634	200,262	37,262	220	8,856	2,304	2,421	58,757	4,552
Alaska	9,726	5,938	3,253	0	0	0	0	535	0
Hawaii	19,946	10,413	341	17	239	82	82	8,667	105
Outlying areas	12,468	4,515	3,198	0	27	50	187	4,389	102

Table B-26. Current expenditures for research and development in universities and colleges, by State, 1964, 1966, 1968, and 1970

State	1964	1966	1968	1970
United States, total	$1,594,895	$2,084,684	$2,598,708	$2,856,427
New England	174,465	239,935	294,786	335,640
Maine	3,712	3,871	4,236	4,615
New Hampshire	6,433	8,669	8,426	11,135
Vermont	3,864	4,212	6,255	6,870
Massachusetts	116,803	171,433	211,853	236,169
Rhode Island	10,542	14,468	16,551	14,668
Connecticut	33,111	37,282	47,465	62,183
Middle Atlantic	316,720	415,443	522,259	543,238
New York	185,312	255,011	312,398	324,550
New Jersey	42,361	46,787	56,937	54,925
Pennsylvania	89,047	113,645	152,924	163,763
East North Central	295,228	369,210	451,084	485,627
Ohio	56,063	67,454	86,992	92,761
Indiana	37,464	47,404	53,904	60,936
Illinois	94,881	108,351	133,334	132,267
Michigan	65,752	86,326	97,049	110,057
Wisoncsin	41,068	59,675	79,805	89,606
West North Central	124,595	161,603	204,896	237,646
Minnesota	29,495	36,116	42,329	49,839
Iowa	23,584	25,635	32,981	36,467
Missouri	33,391	51,118	63,500	76,585
North Dakota	4,582	5,662	6,785	6,688
South Dakota	5,254	10,283	11,470	11,008
Nebraska	9,207	10,440	17,019	22,330
Kansas	19,082	22,349	30,812	34,729
South Atlantic	184,278	245,164	312,687	341,391
Delaware	3,881	3,961	5,254	6,503
Maryland	40,846	49,396	61,548	59,600
District of Columbia	16,344	24,267	27,092	30,695
Virginia	18,598	23,457	25,890	32,552
West Virginia	6,046	7,829	9,244	12,335
North Carolina	35,500	50,205	66,878	68,019
South Carolina	6,937	8,675	9,990	12,715
Georgia	21,953	34,771	48,933	54,982
Flordia	34,173	42,603	57,858	63,990
East South Central	60,472	73,248	93,306	101,408
Kentucky	12,576	15,715	19,173	20,171
Tennessee	23,733	27,566	34,481	37,814
Alabama	15,219	18,187	24,524	25,315
Mississippi	8,944	11,780	15,128	18,108
West South Central	104,087	138,445	177,826	201,054
Arkansas	8,248	9,988	11,719	10,780
Louisiana	25,332	31,795	37,536	41,745
[illegible]	[illegible]	17,012	22,515	22,551

New Jersey	42,361	46,787	56,937	54,925
Pennsylvania	89,047	113,645	152,924	163,763
East North Central	295,228	369,210	451,084	485,627
Ohio	56,063	67,454	86,992	92,761
Indiana	37,464	47,404	53,904	60,936
Illinois	94,881	108,351	133,334	132,267
Michigan	65,752	86,326	97,049	110,057
Wisoncsin	41,068	59,675	79,805	89,606
West North Central	124,595	161,603	204,896	237,646
Minnesota	29,495	36,116	42,329	49,839
Iowa	23,584	25,635	32,981	36,467
Missouri	33,391	51,118	63,500	76,585
North Dakota	4,582	5,662	6,785	6,688
South Dakota	5,254	10,283	11,470	11,008
Nebraska	9,207	10,440	17,019	22,330
Kansas	19,082	22,349	30,812	34,729
South Atlantic	184,278	245,164	312,687	341,391
Delaware	3,881	3,961	5,254	6,503
Maryland	40,846	49,396	61,548	59,600
District of Columbia	16,344	24,267	27,092	30,695
Virginia	18,598	23,457	25,890	32,552
West Virginia	6,046	7,829	9,244	12,335
North Carolina	35,500	50,205	66,878	68,019
South Carolina	6,937	8,675	9,990	12,715
Georgia	21,953	34,771	48,933	54,982
Flordia	34,173	42,603	57,858	63,990
East South Central	60,472	73,248	93,306	101,408
Kentucky	12,576	15,715	19,173	20,171
Tennessee	23,733	27,566	34,481	37,814
Alabama	15,219	18,187	24,524	25,315
Mississippi	8,944	11,780	15,128	18,108
West South Central	104,087	138,445	177,826	201,054
Arkansas	8,248	9,988	11,719	10,780
Louisiana	25,332	31,795	37,536	41,745
Oklahoma	14,301	17,013	22,515	22,551
Texas	56,206	79,649	106,056	125,978
Mountain	87,891	112,174	130,696	158,630
Montana	4,432	7,028	8,056	10,992
Idaho	4,814	5,894	5,895	7,409
Wyoming	4,052	5,918	6,528	7,421
Colorado	24,782	32,399	43,941	58,414
New Mexico	15,893	17,139	21,754	21,523
Arizonia	14,073	17,692	16,242	22,690
Utah	16,593	20,255	21,886	23,798
Nevada	3,252	5,849	6,394	6,383
Pacific	239,393	320,351	399,676	439,325
Washington	30,120	38,704	51,059	58,017
Oregon	19,055	23,594	30,177	37,002
California	177,705	240,425	295,459	314,634
Alaska	4,527	7,509	9,138	9,726
Hawaii	7,986	10,119	13,843	19,946
Outlying areas	7,766	9,111	11,492	12,468

Table B-27. Federally financed current expenditures for research and development in universities and colleges, by State, 1964, 1966, 1968, and 1970

State	1964	1966	1968	1970
United States, total	$917,322	$1,261,034	$1,572,064	$1,658,298
New England	118,600	182,304	223,491	235,027
Maine	1,507	1,107	1,385	1,567
New Hampshire	4 434	6,312	5,823	7,493
Vermont	2,256	2,746	3,246	3,861
Massachusetts	81,443	136,518	171,320	173,829
Rhode Island	7,702	10,059	10,920	8,699
Connecticut	21,258	25,562	30,797	39,578
Middle Atlantic	198,518	263,590	324,085	323,441
New York	120,282	162,054	202,292	202,582
New Jersey	23,437	29,043	34,135	31,311
Pennsylvania	54,799	72,493	87,658	89,548
East North Central	172,334	226,644	261,838	265,824
Ohio	29,023	36,458	47,465	50,310
Indiana	19,306	29,952	33,716	33,375
Illinois	59,265	72,423	83,762	77,250
Michigan	42,505	54,893	61,439	65,018
Wisconsin	22,235	32,918	35,456	39,871
West North Central	57,8	78,341	107,004	118,856
Minnesota	17,090	21,985	27,161	27,848
Iowa	11,220	13,130	15,206	17,166
Missouri	14,944	23,517	36,701	43,682
North Dakota	1,888	1,419	1,572	1,839
South Dakota	2,150	3,405	3,916	3,643
Nebraska	2,997	4,365	5,809	6,625
Kansas	7,557	10,520	16,639	18,053
South Atlantic	99,208	137,494	178,038	190,141
Delaware	1,566	1,847	2,203	2,914
Maryland	28,712	35,114	42,611	42,044
District of Columbia	11,241	16,432	18,158	20,629
Virginia	9,273	12,122	13,176	17,832
West Virginia	1,921	3,817	6,034	5,823
North Carolina	18,169	27,844	42,737	42,403
South Carolina	2,640	3,642	3,835	4,631
Georgia	9,911	16,074	20,843	25,231
Florida	15,775	20,602	28,441	28,634
East South Central	28,623	37,599	47,019	55,644
Kentucky	4,833	7,145	8,756	9,996
Tennessee	12,964	16,538	19,253	23,119
Alabama	6,868	8,286	12,087	13,385
Mississippi	3,958	5,630	6,923	9,144
West South Central	49,838	71,432	95,076	96,446
Arkansas	3,358	4,872	5,425	4,609
Louisiana	11,681	14,604	19,802	21,248
Oklahoma	6,603	8,208	12,475	8,747
Texas	28,196	43,748	57,374	61,842
Mountain	47,039	62,043	76,696	96,822
Montana	1,621	2,478	3,722	4,656
Idaho	1,486	1,898	1,899	2,801
Wyoming	999	1,728	2,694	3,403
Colorado	15,863	20,653	29,914	41,027

Indiana	19,306	29,952	33,716	33,375
Illinois	59,265	72,423	83,762	77,250
Michigan	42,505	54,893	61,439	65,018
Wisconsin	22,235	32,918	35,456	39,871
West North Central	57,846	78,341	107,004	118,856
Minnesota	17,090	21,985	27,161	27,848
Iowa	11,220	13,130	15,206	17,166
Missouri	14,944	23,517	36,701	43 682
North Dakota	1,888	1,419	1,572	1,839
South Dakota	2,150	3,405	3,916	3,643
Nebraska	2,997	4,365	5,809	6,625
Kansas	7,557	10,520	16,639	18,053
South Atlantic	99,208	137,494	178,038	190,141
Delaware	1,566	1,847	2,203	2,914
Maryland	28,712	35,114	42,611	42,044
District of Columbia	11,241	16,432	18,158	20,629
Virginia	9,273	12,122	13,176	17,832
West Virginia	1,921	3,817	6,034	5,823
North Carolina	18,169	27,844	42,737	42,403
South Carolina	2,640	3,642	3,835	4,631
Georgia	9,911	16,074	20,843	25,231
Florida	15,775	20,602	28,441	28,634
East South Central	28,623	37,599	47,019	55,644
Kentucky	4,833	7,145	8,756	9,996
Tennessee	12,964	16,538	19,253	23,119
Alabama	6,868	8,286	12,087	13,385
Mississippi	3,958	5,630	6,923	9,144
West South Central	49,838	71,432	95,076	96,446
Arkansas	3,358	4,872	5,425	4,609
Louisiana	11,681	14,604	19,802	21,248
Oklahoma	6,603	8,208	12,475	8,747
Texas	28,196	43,748	57,374	61,842
Mountain	47,039	62,043	76,696	96,822
Montana	1,621	2,478	3,722	4,656
Idaho	1,486	1,898	1,899	2,801
Wyoming	999	1,728	2,694	3,403
Colorado	15,863	20,653	29,914	41,027
New Mexico	11,449	12,497	14,926	16,885
Arizona	6,638	8,443	7,345	9,534
Utah	7,833	12,209	13,336	15,656
Nevada	1,150	2,137	2,860	2,860
Pacific	141,939	198,030	254,587	271,582
Washington	16,318	21,765	30,774	33,180
Oregon	10,775	14,010	18,152	21,789
California	108,270	151,613	193,368	200,262
Alaska	2,299	5,027	5,596	5,938
Hawaii	4,177	5,615	6,697	10,413
Outlying areas	3,477	3,557	4,230	4,515

Table B-28. Current expenditures for research in universities and colleges by field of science and source of funds, 1964, 1966, 1968, and 1970[a]

[Dollars in thousands]

Field of science and source of funds	1964	1966	1968	1970
Total	$1,554,291	$2,001,390	$2,503,259	$2,712,233
Federal Government	894,579	1,202,320	1,504,359	1,554,713
Other Sources	659,712	799,070	998,900	1,157,520
Engineering	198,768	280,363	333,988	346,427
Federal Government	124.912	183,020	217,358	212,538
Other sources	73,856	97,343	116,630	133,889
Physical and environmental sciences	319,272	409,168	498,861	499,066
Federal Government	228,106	295,252	353,751	344,297
Other sources	91,166	113,916	145,110	154,769
Mathematics	48,246	61,205	79,118	102,444
Federal Government	25,118	29,657	39,941	47,667
Other sources	23,128	31,548	39,177	54,777
Life sciences	794,967	981,113	1,169,390	1,311,366
Federal Government	443,389	577,006	703,125	767,053
Other sources	351,578	404,107	466,265	544,313
Psychology	43,985	55,487	77,464	79,532
Federal Government	26,993	33,482	47,458	45,005
Other sources	16,992	22,005	30,006	34,527
Social sciences	125,351	168,294	247,085	272,982
Federal Government	40,961	60,047	98,612	93,112
Other sources	84,390	108,247	148,473	179,870
Other sciences, n.e.c.	23,702	45,760	97,353	100,416
Federal Government	5,100	23,856	44,114	45,041
Other sources	18,602	21,904	53,239	55,375

[a]Excludes current development expenditures totaling $144.2 million, for which the survey did not request a field-of-science distribution.

Table B-29. Current expenditures for research in universities and colleges, by field of science, source of funds, and type of institution, 1970

(Dollars in thousands)

Field of science and source of funds	Total	Institutions granting: Doctorate	Master's	Bachelor's	No science degree
Total	$2,712,233	$2,615,142	$74,045	$17,204	$5,842
Federal Government	1,554,713	1,527,671	19,415	5,441	2,186
Other sources	1,157,520	1,087,471	54,630	11,763	3,656
Engineering	346,427	336,399	7,808	1,474	746
Federal Government	212,538	209,373	2,431	470	264
Other sources	133,889	127,026	5,377	1,004	482
Physical sciences	368,789	351,159	12,740	4,673	217
Federal Government	264,649	258,299	4,106	2,105	139
Other sources	104,140	92,860	8,634	2,568	78
Environmental sciences	130,277	124,506	3,537	446	1,788

Federal Government	25,118	29,657	39,941	47,667
Other sources	23,128	31,548	39,177	54,777
Life sciences	794,967	981,113	1,169,390	1,311,366
Federal Government	443,389	577,006	703,125	767,053
Other sources	351,578	404,107	466,265	544,313
Psychology	43,985	55,487	77,464	79,532
Federal Government	26,993	33,482	47,458	45,005
Other sources	16,992	22,005	30,006	34,527
Social sciences	125,351	168,294	247,085	272,982
Federal Government	40,961	60,047	98,612	93,112
Other sources	84,390	108,247	148,473	179,870
Other sciences, n.e.c.	23,702	45,760	97,353	100,416
Federal Government	5,100	23,856	44,114	45,041
Other sources	18,602	21,904	53,239	55,375

[a]Excludes current development expenditures totaling $144.2 million, for which the survey did not request a field-of-science distribution.

Table B-29. Current expenditures for research in universities and colleges, by field of science, source of funds, and type of institution, 1970

(Dollars in thousands)

Field of science and source of funds	Total	Institutions granting: Doctorate	Master's	Bachelor's	No science degree
Total	$2,712,233	$2,615,142	$74,045	$17,204	$5,842
Federal Government	1,554,713	1,527,671	19,415	5,441	2,186
Other sources	1,157,520	1,087,471	54,630	11,763	3,656
Engineering	346,427	336,399	7,808	1,474	746
Federal Government	212,538	209,373	2,431	470	264
Other sources	133,889	127,026	5,377	1,004	482
Physical sciences	368,789	351,159	12,740	4,673	217
Federal Government	264,649	258,299	4,106	2,105	139
Other sources	104,140	92,860	8,634	2,568	78
Evnironmental sciences	130,277	124,506	3,537	446	1,788
Federal Government	79,648	77,064	1,164	189	1,231
Other sources	50,629	47,442	2,373	257	557
Mathematics	102,444	94,144	6,217	1,620	463
Federal Government	47,667	46,749	467	412	39
Other sources	54,777	47,395	5,750	1,208	424
Life Sciences	1,311,366	1,293,170	13,973	2,994	1,229
Federal Government	767,053	760,824	4,936	1,005	288
Other sources	544,313	532,346	9,037	1,989	941
Psychology	79,532	71,340	6,687	1,327	178
Federal Government	45,005	42,807	1,778	398	22
Other sources	34,527	28,533	4,909	929	156
Social sciences	272,982*	249,401	18,561	4,001	1,019
Federal Government	93,112	89,166	3,140	642	164
Other sources	179,870	160,235	15,421	3,359	855
Other sciences, n.e.c.	100,416	95,023	4,522	669	202
Federal Government	45,041	43,389	1,393	220	39
Other sources	55,375	51,634	3,129	449	163

Table B-30. Current expenditures for research in universities and colleges, by State and field of science, 1970

[Dollars in thousands]

State	Total	Engineering	Physical sciences	Environmental sciences	Mathematics	Life sciences	Psychology	Social sciences	Other sciences
United States, total	$2,712,233	$346,427	$368,789	$130,277	$102,444	$1,311,366	$79,532	$272,982	$100,416
New England	305,293	59,476	54,731	24,571	10,240	108,461	7,553	36,585	3,676
Maine	4,383	435	200	279	135	2,597	225	512	--------
New Hampshire	11,135	1,163	2,327	220	316	5,279	293	723	814
Vermont	6,784	267	394	1,232	105	3,603	350	682	151
Massachusetts	206,550	51,753	40,697	21,025	6,835	57,332	4,180	23,110	1,618
Rhode Island	14,643	2,442	2,932	551	1,885	3,833	595	1,973	432
Connecticut	61,798	3,416	8,181	1,264	964	35,817	1,910	9,585	661
Middle Atlantic	528,598	58,308	74,682	24,807	19,229	262,019	16,376	49,458	23,719
New York	319,329	29,436	41,183	15,090	9,924	177,439	9,219	25,452	11,586
New Jersey	54,028	9,646	11,579	2,891	2,733	14,338	2,689	8,385	1,767
Pennsylvania	155,241	19,226	21,920	6,826	6,572	70,242	4,468	15,621	10,366
East North Central	467,632	71,017	63,278	17,394	22,606	188,397	19,117	65,895	19,928
Ohio	91,512	16,364	9,604	1,882	2,567	46,495	2,585	6,441	5,574
Indiana	58,686	7,841	10,400	2,291	3,089	26,597	1,792	6,060	616
Illinois	125,610	17,579	19,769	3,935	7,606	49,758	3,446	20,350	3,167
Michigan	103,096	23,787	10,529	2,484	4,211	34,348	6,562	18,504	2,671
Wisconsin	88,728	5,446	12,976	6,802	5,133	31,199	4,732	14,540	7,900
West North Central	227,311	20,903	18,060	9,588	8,244	126,720	5,862	26,555	11,379
Minnesota	47,128	4,502	5,074	1,079	1,547	26,469	1,481	3,702	3,274
Iowa	36,277	4,417	4,497	545	1,803	18,931	710	5,036	338
Missouri	70,265	6,196	3,952	3,590	2,121	37,498	1,087	10,142	5,679
North Dakota	6,177	372	572	69	93	3,902	80	1,050	39
South Dakota	10,590	775	724	1,504	124	6,683	78	280	422
Nebraska	22,321	1,408	1,171	361	1,731	14,973	245	2,184	248
Kansas	34,553	3,233	2,070	2,440	825	18,264	2,181	4,161	1,379
South Atlantic	333,307	33,030	37,155	11,182	12,394	191,718	7,026	24,777	16,025
Delaware	6,480	1,352	1,167	131	320	1,617	226	1,291	376
Maryland	59,382	4,175	8,871	3,633	2,944	34,198	733	2,380	2,448
District of Columbia	29,609	2,088	3,217	200	572	15,345	633	5,577	1,977
Virginia	32,231	4,891	3,557	1,370	982	17,219	715	2,061	1,436
West Virginia	12,096	1,614	1,393	476	295	6,780	305	893	340
North Carolina	65,652	2,283	6,306	1,180	1,666	43,142	1,451	3,288	6,336
South Carolina	11,897	1,553	827	343	416	7,653	141	822	142
Georgia	53,288	6,989	4,415	1,864	3,033	29,052	1,610	5,235	1,090
Florida	62,672	8,085	7,402	1,985	2,166	36,712	1,212	3,230	1,880
East South Central	98,266	8,227	4,999	3,747	1,749	62,943	5,341	8,532	2,728
Kentucky	20,125	1,202	1,086	2,635	396	11,327	1,297	1,730	452
Tennessee	36,570	3,096	2,267	289	653	23,831	3,493	1,831	1,110
Alabama	25,034	2,772	1,148	430	433	16,640	233	2,311	1,067
Mississippi	16,537	1,157	498	393	267	11,145	318	2,660	99
West South Central	194,868	23,649	20,489	10,517	7,156	108,960	3,475	14,936	5,786
Arkansas	10,474	711	721	805	181	7,000	241	768	47
Louisiana	40,468	2,793	3,149	1,197	1,585	25,321	332	3,643	2,448
Oklahoma	21,728	3,642	1,607	863	1,309	10,177	343	2,892	895
Texas	122,198	16,403	15,012	7,652	4,081	66,462	2,559	7,633	2,396
Mountain	142,619	27,243	20,800	7,700	4,051	55,719	5,242	13,399	8,465
Montana	10,613	1,095	1,119	357	372	4,542	426	1,807	895

New Jersey	34,925	3,848	11,579	2,891	2,733	14,338	2,689	8,385	1,717
Pennsylvania	155,241	19,226	21,920	6,826	6,572	70,242	4,468	15,621	10,366
East North Central	467,632	71,017	63,278	17,394	22,606	188,397	19,117	65,895	19,928
Ohio	91,512	16,364	9,604	1,882	2,567	46,495	2,585	6,441	5,574
Indiana	58,686	7,841	10,400	2,291	3,089	26,597	1,792	6,060	616
Illinois	125,610	17,579	19,769	3,935	7,606	49,758	3,446	20,350	3,167
Michigan	103,096	23,787	10,529	2,484	4,211	34,348	6,562	18,504	2,671
Wisconsin	88,728	5,446	12,976	6,802	5,133	31,199	4,732	14,540	7,900
West North Central	227,311	20,903	18,060	9,588	8,244	126,720	5,862	26,555	11,379
Minnesota	47,128	4,502	5,074	1,079	1,547	26,469	1,481	3,702	3,274
Iowa	36,277	4,417	4,497	545	1,803	18,931	710	5,036	338
Missouri	70,265	6,196	3,952	3,590	2,121	37,498	1,087	10,142	5,679
North Dakota	6,177	372	572	69	93	3,902	80	1,050	39
South Dakota	10,590	775	724	1,504	124	6,683	78	280	422
Nebraska	22,321	1,408	1,171	361	1,731	14,973	245	2,184	248
Kansas	34,553	3,233	2,070	2,440	825	18,264	2,181	4,161	1,379
South Atlantic	333,307	33,030	37,155	11,182	12,394	191,718	7,026	24,777	16,025
Delaware	6,480	1,352	1,167	131	320	1,617	226	1,291	376
Maryland	59,382	4,175	8,871	3,633	2,944	34,198	733	2,380	2,448
District of Columbia	29,609	2,088	3,217	200	572	15,345	633	5,577	1,977
Virginia	32,231	4,891	3,557	1,370	982	17,219	715	2,061	1,436
West Virginia	12,096	1,614	1,393	476	295	6,780	305	893	340
North Carolina	65,652	2,283	6,306	1,180	1,666	43,142	1,451	3,288	6,336
South Carolina	11,897	1,553	827	343	416	7,653	141	822	142
Georgia	53,288	6,989	4,415	1,864	3,033	29,052	1,610	5,235	1,090
Florida	62,672	8,085	7,402	1,985	2,166	36,712	1,212	3,230	1,880
East South Central	98,266	8,227	4,999	3,747	1,749	62,943	5,341	8,532	2,728
Kentucky	20,125	1,202	1,086	2,635	396	11,327	1,297	1,730	452
Tennessee	36,570	3,096	2,267	289	653	23,831	3,493	1,831	1,110
Alabama	25,034	2,772	1,148	430	433	16,640	233	2,311	1,067
Mississippi	16,537	1,157	498	393	267	11,145	318	2,660	99
West South Central	194,868	23,549	20,489	10,517	7,156	108,960	3,475	14,936	5,786
Arkansas	10,474	711	721	805	181	7,000	241	768	47
Louisiana	40,468	2,793	3,149	1,197	1,585	25,321	332	3,643	2,448
Oklahoma	21,728	3,642	1,607	863	1,309	10,177	343	2,892	895
Texas	122,198	16,403	15,012	7,652	4,081	66,462	2,559	7,633	2,396
Mountain	142,619	27,243	20,800	7,700	4,051	55,719	5,242	13,399	8,465
Montana	10,613	1,095	1,119	357	372	4,542	426	1,807	895
Idaho	4,850	565	349	97	63	2,929	34	413	400
Wyoming	6,839	627	1,379	993	152	463	759	539	1,927
Colorado	54,813	9,137	7,236	1,987	1,417	26,249	1,936	3,584	3,267
New Mexico	15,466	7,668	1,538	1,602	455	2,357	424	1,133	289
Arizona	20,526	3,526	5,601	1,734	720	5,180	851	2,906	8
Utah	23,451	3,857	2,760	640	655	10,989	644	2,447	1,459
Nevada	6,061	768	818	290	217	3,010	168	570	220
Pacific	403,500	43,886	74,080	20,318	16,550	198,364	9,280	32,395	8,627
Washington	57,035	6,446	6,209	5,791	1,189	29,628	1,608	3,598	2,566
Oregon	35,904	1,278	4,257	3,436	1,475	20,673	1,151	2,217	1,417
California	282,277	34,008	60,152	6,918	13,427	134,117	5,920	23,569	4,166
Alaska	9,724	1,234	1,352	479	306	4,948	249	784	372
Hawaii	18,560	920	2,110	3,694	153	8,998	352	2,227	106
Outlying areas	10,839	788	515	453	225	8,065	260	450	83

Table B-31 Current expenditures for instruction in the sciences and engineering in universities and colleges, by State and field of science, 1970

[Dollars in thousands]

State	Total	Engineering	Physical and environmental sciences	Mathematics	Life sciences	Psychology	Social sciences	Other sciences
United States, total	$4,064,163	$512,828	$622,042	$366,649	$1,286,674	$228,120	$939,110	$108,740
New England	379,746	52,071	58,490	27,842	119,246	18,505	96,213	7,379
Maine	12,132	1,882	2,088	1,311	2,375	785	3,675	16
New Hampshire	16,753	1,790	2,903	1,379	4,974	1,026	4,314	367
Vermont	16,784	1,258	2,389	1,205	5,524	717	5,171	520
Massachusetts	233,962	38,381	38,396	17,048	77,487	10,756	47,713	4,181
Rhode Island	17,741	2,094	2,421	1,923	2,755	1,085	6,715	748
Connecticut	82,374	6,666	10,293	4,976	26,131	4,136	28,625	1,547
Middle Atlantic	783,916	100,903	119,142	69,934	237,804	44,638	182,715	28,780
New York	436,036	56,402	67,051	38,590	132,860	25,397	100,009	15,727
New Jersey	85,140	12,323	13,614	10,120	20,415	5,255	22,636	777
Pennsylvania	262,740	32,178	38,477	21,224	84,529	13,986	60,070	12,276
East North Central	784,865	100,057	123,803	71,649	237,154	49,091	188,665	14,446
Ohio	161,039	20,427	25,650	15,371	55,068	12,190	30,499	1,834
Indiana	109,900	16,444	21,263	11,857	30,475	6,762	22,282	817
Illinois	223,383	20,808	31,795	19,516	73,142	12,205	58,118	7,799
Michigan	186,190	29,505	26,787	15,778	54,729	10,978	45,075	3,338
Wisconsin	104,353	12,873	18,308	9,127	23,740	6,956	32,691	658
West North Central	353,144	36,940	50,741	34,363	101,684	17,755	101,718	9,943
Minnesota	77,051	5,748	11,753	5,879	25,067	4,354	21,080	3,170
Iowa	67,616	7,892	9,220	5,905	21,606	3,352	18,775	866
Missouri	96,453	10,959	13,998	13,483	25,986	4,151	27,209	667
North Dakota	16,568	1,721	2,165	945	3,987	624	7,059	67
South Dakota	10,645	1,452	1,642	942	2,833	633	2,088	1,055
Nebraska	31,048	2,876	4,316	2,581	10,015	1,665	8,909	686
Kansas	53,763	6,292	7,647	4,628	12,190	2,976	16,598	3,432
South Atlantic	500,617	62,637	74,103	50,002	168,359	27,383	103,763	14,370
Delaware	12,405	2,239	2,356	1,503	1,793	603	3,079	832
Maryland	65,830	7,604	11,973	7,894	22,480	3,259	12,310	310
District of Columbia	42,243	5,616	5,195	2,990	16,566	1,796	9,282	792
Virginia	62,811	8,972	9,826	6,804	18,021	3,597	13,785	1,806
West Virginia	32,815	4,021	3,711	1,474	17,402	1,233	4,522	452
North Carolina	85,916	7,612	12,785	9,101	27,474	5,391	19,055	4,498
South Carolina	34,029	7,209	5,182	3,779	9,354	1,684	5,826	995
Georgia	81,134	7,679	10,458	7,241	30,016	5,428	18,242	2,070
Florida	83,434	11,685	12,617	9,210	25,253	4,392	17,662	2,615
East South Central	191,348	22,705	23,596	15,814	69,465	13,656	39,299	6,813
Kentucky	49,112	3,331	5,319	3,076	21,538	5,223	8,389	2,236
Tennessee	60,619	8,710	8,020	5,456	21,618	4,795	11,207	813
Alabama	55,442	6,910	7,118	4,807	16,698	2,316	14,149	3,444
Mississippi	26,175	3,754	3,139	2,475	9,611	1,322	5,554	320
West South Central	287,161	35,379	47,464	27,228	96,805	14,426	58,301	7,558
Arkansas	17,315	1,893	2,877	1,793	5,505	1,026	3,904	317
Louisiana	51,464	5,362	7,210	4,886	23,291	1,839	8,624	252
Oklahoma	38,442	6,058	6,256	3,466	10,128	2,271	9,151	1,112

East North Central	784,865	100,097	125,803	71,845	237,151	45,051	188,665	14,446
Ohio	161,039	20,427	25,650	15,371	55,068	12,190	30,499	1,834
Indiana	109,900	16,444	21,263	11,857	30,475	6,762	22,282	817
Illinois	223,383	20,808	31,795	19,516	73,142	12,205	58,118	7,799
Michigan	186,190	29,505	26,787	15,778	54,729	10,978	45,075	3.338
Wisconsin	104,353	12,873	18,308	9,127	23,740	6,956	32,691	658
West North Central	353,144	36,940	50,741	34,363	101,684	17,755	101,718	9,943
Minnesota	77,051	5,748	11,753	5,879	25,067	4,354	21,080	3,170
Iowa	67,616	7,892	9,220	5,905	21,606	3,352	18,775	866
Missouri	96,453	10,959	13,998	13,483	25,986	4,151	27,209	667
North Dakota	16,568	1,721	2,165	945	3,987	624	7,059	67
South Dakota	10,645	1,452	1,642	942	2,833	633	2,088	1,055
Nebraska	31,048	2,876	4,316	2,581	10,015	1,665	8,909	686
Kansas	53,753	6,292	7,647	4,628	12,190	2,976	16,598	3,132
South Atlantic	500,617	62,637	74,103	50,002	168,359	27,383	103,763	14,370
Delaware	12,405	2,239	2,356	1,503	1,793	603	3,079	832
Maryland	65,830	7,604	11,973	7,894	22,480	3,259	12,310	310
District of Columbia	42,243	5,616	5,195	2,996	16,566	1,796	9,282	792
Virginia	62,811	8,972	9,826	6,804	18,021	3,597	13,785	1,806
West Virginia	32,815	4,021	3,711	1,474	17,402	1,233	4,522	452
North Carolina	85,916	7,612	12,785	9,101	27,474	5,391	19,055	4,498
South Carolina	34,029	7,209	5,182	3,779	9,354	1,684	5,826	995
Georgia	81,134	7,679	10,458	7,241	30,016	5,428	18,242	2,070
Florida	83,434	11,685	12,617	9,210	25,253	4,392	17,662	2,615
East South Central	191,348	22,705	23,596	15,814	69,465	13,656	39,299	6,813
Kentucky	49,112	3,331	5,319	3,076	21,538	5,223	8,389	2,236
Tennessee	60,619	8,710	8,020	5,456	21,618	4,795	11,207	813
Alabama	55,442	6,910	7,118	4 807	16,698	2,316	14,149	3,444
Mississippi	26,175	3,754	3,139	2,475	9,611	1,322	5,554	320
West South Central	287,161	35,379	47,464	27,228	96,805	14,426	58,301	7,558
Arkansas	17,315	1,893	2,877	1,793	5,505	1,026	3,904	317
Louisiana	51,464	5,362	7,210	4,886	23,291	1,839	8,624	252
Oklahoma	38,442	6,058	6,256	3,466	10,128	2,271	9,151	1,112
Texas	179,940	22,066	31,121	17,083	57,881	9,290	36,622	5,877
Mountain	180,457	27,069	30,598	18,028	44,246	12,678	40,208	7,630
Montana	17,337	1,797	2,362	1,480	4,829	989	3,967	1,913
Idaho	9,366	1,562	2,033	943	2,540	510	1,709	69
Wyoming	8,169	1,217	1,897	674	1,068	909	894	1,960
Colorado	60,192	7,858	9,532	6,169	15,243	4,257	13,959	3,174
New Mexico	12,285	2,171	2,402	1,821	2,596	622	2,652	21
Arizona	40,628	7,559	6,136	3,978	8,118	3,806	10,892	139
Utah	26,181	4,114	5,469	2,464	7,835	1,240	4,838	221
Nevada	5,849	791	767	499	2,017	345	1,297	133
Pacific	578,213	72,597	90,926	50,507	198,647	28,941	125,081	11,514
Washington	83,420	9,692	12,133	6,040	34,686	4,286	14,726	1,857
Oregon	47,266	3,169	7,567	4,822	17,424	2,370	7,695	4,219
California	431,409	57,954	68,446	38,361	141,219	21,394	98,709	5,326
Alaska	3,656	448	557	266	1,319	223	759	84
Hawaii	12,462	1,334	2,223	1,018	3,999	668	3,192	28
Outlying areas	24,696	2,470	3,179	1,282	13,264	1,047	3,147	307

Table B-32. Current expenditures for instruction in the sciences and engineering in universities and colleges, by field of science and type of institution, 1970

[Dollars in thousands]

Field of science	Total	Institutions granting — Doctorate	Master's	Bachelor's	No science degree
Total	$4,064,163	$2,688,853	$528,367	$375,803	$471,140
Engineering	512,828	375,326	49,410	17,459	70,633
Physical and environmental sciences	622,042	369,799	104,828	77,454	69,961
Mathematics	366,649	184,737	64,178	48,366	69,368
Life sciences	1,286,674	1,041,986	82,930	67,347	94,411
Psychology	228,120	108,423	51,282	35,042	33,373
Social sciences	939,110	543,820	157,359	121,759	116,172
Other sciences, n.e.c.	108,740	64,762	18,380	8,376	17,222

Table B-33. Capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by type of institution, source of funds, and purpose, 1970

[Dollars in thousands]

Type of institution	Total capital expenditures: Total	Federal Government	Other sources	R&D and graduate instruction: Total	Federal Government	Other sources	Undergraduate instruction: Total	Federal Government	Other sources
Total	$951,873	$279,316	$672,557	$505,885	$179,718	$326,167	$445,988	$99,598	$346,390
Doctorate	735,333	223,330	512,003	480,100	169,657	310,443	255,233	53,673	201,560
Master's	83,017	20,648	62,369	19,272	6,967	12,305	63,745	13,681	50,064
Bachelor's	68,106	25,724	42,382	4,711	2,614	2,097	63,395	23,110	40,285
No science degree	65,417	9,614	55,803	1,802	480	1,322	63,615	9,134	54,481

Table B-34. Capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by State, source of funds, and purpose, 1970

[Dollars in thousands]

State	All sources			Federal government			Other sources		
	Total	R&D and graduate instruction	Undergraduate instruction	Total	R&D and graduate instruction	Undergraduate instruction	Total	R&D and graduate instruction	Undergraduate instruction
United States, total	$951,873	$505,885	$445,988	$279,316	$179,718	$ 99,598	$672,557	$326,167	$346,390
New England	81,645	46,600	35,045	15,529	10,553	4,976	66,116	36,047	30,069
Maine	1,314	13	1,301	302	5	297	1,012	8	1,004
New Hampshire	7,821	3,856	3,965	1,504	936	568	6,317	2,920	3,397
Vermont	5,847	2,065	3,782	1,089	640	449	4,758	1,425	3,333
Massachusetts	39,183	25,650	13,533	7,457	5,705	1,752	31,726	19,945	11,781
Rhode Island	2,495	1,675	820	1,399	945	454	1,096	730	366
Connecticut	24,985	13,341	11,644	3,778	2,322	1,456	21,207	11,019	10,188
Middle Atlantic	190,202	122,144	68,058	44,816	31,327	13,489	145,386	90,817	54,569
New York	99,125	68,513	30,612	17,820	11,847	5,973	81,305	56,666	24,639
New Jersey	25,378	17,187	8,191	7,039	6,470	569	18,339	10,717	7,622
Pennsylvania	65,699	36,444	29,255	19,957	13,010	6,947	45,742	23,434	22,308
East North Central	170,740	85,524	85,216	50,058	30,674	19,384	120,682	54,850	65,832
Ohio	37,877	19,150	18,727	12,929	6,992	5,937	24,948	12,158	12,790
Indiana	26,982	15,171	11,811	10,467	6,643	3,824	16,515	8,528	7,987
Illinois	37,087	18,519	18,568	8,792	4,980	3,812	28,295	13,539	14,756
Michigan	47,342	27,093	20,249	16,042	11,087	4,955	31,300	16,006	15,294
Wisconsin	21,452	5,591	15,861	1,828	972	856	19,624	4,619	15,005
West North Central	90,606	42,679	47,927	23,643	15,057	8,586	66,963	27,622	39,341
Minnesota	31,047	6,756	24,291	5,180	2,719	2,461	25,867	4,037	21,830
Iowa	14,265	10,527	3,738	5,163	4,412	751	9,102	6,115	2,987
Missouri	26,310	18,198	8,112	5,509	4,234	1,275	20,801	13,964	6,837
North Dakota	1,003	702	301	566	416	150	437	286	151
South Dakota	2,745	1,874	871	1,041	773	268	1,704	1,101	603
Nebraska	7,077	2,830	4,247	2,748	1,175	1,573	4,329	1,655	2,674
Kansas	8,159	1,792	6,367	3,436	1,328	2,108	4,723	464	4,259
South Atlantic	134,811	70,101	64,710	45,591	28,397	17,194	89,220	41,704	47,516
Delaware	3,470	1,901	1,569	401	181	220	3,069	1,720	1,349
Maryland	11,963	6,315	5,648	5,309	3,494	1,815	6,654	2,821	3,833
District of Columbia	7,259	4,280	2,979	3,881	3,387	494	3,378	893	2,485
Virginia	22,304	10,211	12,093	5,282	3,530	1,752	17,022	6,681	10,341
West Virginia	5,212	625	4,587	2,388	321	2,067	2,824	304	2,520
North Carolina	39,196	20,096	19,100	16,271	10,537	5,734	22,925	9,559	13,366
South Carolina	4,859	1,708	3,151	1,896	848	1,048	2,963	860	2,103
Georgia	20,775	13,480	7,295	3,067	1,375	1,692	17,708	12,105	5,603
Florida	19,773	11,485	8,288	7,096	4,724	2,372	12,677	6,761	5,916
East South Central	44,011	23,076	20,935	17,006	12,712	4,294	27,005	10,364	16,641
Kentucky	17,614	13,133	4,481	7,179	7,004	175	10,435	6,129	4,306
Tennessee	7,848	2,695	5,153	2,470	1,501	969	5,378	1,194	4,184
Alabama	12,635	5,144	7,491	5,158	3,285	1,873	7,477	1,859	5,618
Mississippi	5,914	2,104	3,810	2,199	922	1,277	3,715	1,182	2,533
West South Central	54,009	32,962	21,047	16,126	11,218	4,908	37,883	21,744	16,139

Pennsylvania	65,699	36,444	29,255	19,957	13,010	6,947	45,742	23,434	22,308
East North Central	170,740	85,524	85,216	50,058	30,674	19,384	120,682	54,850	65,832
Ohio	37,877	19,150	18,727	12,929	6,992	5,937	24,948	12,158	12,790
Indiana	26,982	15,171	11,811	10,467	6,643	3,824	16,515	8,528	7,987
Illinois	37,087	18,519	18,568	8,792	4,980	3,812	28,295	13,539	14,756
Michigan	47,342	27,093	20,249	16,042	11,087	4,955	31,300	16,006	15,294
Wisconsin	21,452	5,591	15,861	1,828	972	856	19,624	4,619	15,005
West North Central	90,606	42,679	47,927	23,643	15,057	8,586	66,963	27,622	39,341
Minnesota	31,047	6,756	24,291	5,180	2,719	2,461	25,867	4,037	21,830
Iowa	14,265	10,527	3,738	5,163	4,412	751	9,102	6,115	2,987
Missouri	26,310	18,198	8,112	5,509	4,234	1,275	20,801	13,964	6,837
North Dakota	1.003	702	301	566	416	150	437	286	151
South Dakota	2,745	1,874	871	1,041	773	268	1,704	1,101	603
Nebraska	7,077	2,830	4,247	2,748	1,175	1,573	4,329	1,655	2,674
Kansas	8,159	1,792	6,367	3,436	1,328	2,108	4,723	464	4,259
South Atlantic	134,811	70,101	64,710	45,591	28,397	17,194	89,220	41,704	47,516
Delaware	3,470	1,901	1,569	401	181	220	3,069	1,720	1,349
Maryland	11,963	6,315	5,648	5,309	3,494	1,815	6,654	2,821	3,833
District of Columbia	7,259	4,280	2,979	3,881	3,387	494	3,378	893	2,485
Virginia	22,304	10,211	12,093	5,282	3,530	1,752	17,022	6,681	10,341
West Virginia	5,212	625	4,587	2,388	321	2,067	2,824	304	2,520
North Carolina	39,196	20,096	19,100	16,271	10,537	5,734	22,925	9,559	13,366
South Carolina	4,859	1,708	3,151	1,896	848	1,048	2,963	860	2,103
Georgia	20,775	13,480	7,295	3,067	1,375	1,692	17,708	12,105	5,603
Florida	19,773	11,485	8,288	7,096	4,724	2,372	12,677	6,761	5,916
East South Central	44,011	23,076	20,935	17,006	12,712	4,294	27,005	10,364	16,641
Kentucky	17,614	13,133	4,481	7,179	7,004	175	10,435	6,129	4,306
Tennessee	7,848	2,695	5,153	2,470	1,501	969	5,378	1,194	4,184
Alabama	12,635	5,144	7,491	5,158	3,285	1,873	7,477	1,859	5,618
Mississippi	5,914	2,104	3,810	2,199	922	1,277	3,715	1,182	2,533
West South Central	54,009	32,962	21,047	16,126	11,218	4,908	37,883	21,744	16,139
Arkansas	2,025	381	1,644	667	161	506	1,358	220	1,138
Louisiana	9,187	6,848	2,339	3,614	2,577	1,037	5,573	4,271	1,302
Oklahoma	4,035	1,538	2,497	1,211	487	724	2,824	1,051	1,773
Texas	38,762	24,195	14,567	10,634	7,993	2,641	28,128	16,202	11,926
Mountain	78,545	33,621	44,924	30,740	16,889	13,851	47,805	16,732	31,073
Montana	2,351	1,072	1,279	365	310	55	1,986	762	1,224
Idaho	1,606	688	918	331	99	232	1,275	589	686
Wyoming	4,240	1,354	2,886	1,219	332	887	3,021	1,022	1,999
Colorado	38,439	11,705	26,734	14,413	4,077	10,336	24,026	7,628	16,398
New Mexico	3,262	1,731	1,531	875	668	207	2,387	1,063	1,324
Arizona	19,256	12,065	7,191	9,949	8,484	1,465	9,307	3,581	5,726
Utah	7,058	4,323	2,735	2,948	2,707	241	4,110	1,616	2,494
Nevada	2,333	683	1,650	640	212	428	1,693	471	1,222
Pacific	106,010	48,235	57,775	35,641	22,772	12,869	70,369	25,463	44,906
Washington	14,697	8,789	5,908	2,607	2,071	536	12,090	6,718	5,372
Oregon	8,281	5,614	2,667	4,517	4,295	222	3,764	1,319	2,445
California	69,660	22,793	46,867	23,274	11,291	11,983	46,386	11,502	34,884
Alaska	258	168	90	110	72	38	148	96	52
Hawaii	13,114	10,871	2,243	5,133	5,043	90	7,981	5,828	2,153
Outlying areas	1,294	943	351	166	119	47	1,128	824	304

Table B-35. Capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by State, and source of funds, 1964, 1966, 1968, and 1970

[Dollars in thousands]

State	Total capital expenditures				Federal Government			
	1964	1966	1968	1970	1964	1966	1968	1970
United States, total	$529,492	$666,997	$1,070,727	$951,873	$134,439	$212,397	$340,447	$279,316
New England	39,553	45,166	73,228	81,645	13,164	14,555	18,646	15,529
Maine	696	880	1,507	1,314	192	368	512	302
New Hampshire	3,046	3,138	2,654	7,821	1,483	547	628	1,504
Vermont	667	916	2,967	5,847	489	553	1,190	1,089
Massachusetts	21,607	24,783	43,728	39,183	6,879	8,522	10,234	7,457
Rhode Island	1,596	1,810	6,212	2,495	583	328	2,336	1,399
Connecticut	11,941	13,639	16,160	24,985	3,538	4,237	3,746	3,778
Middle Atlantic	107,631	136,070	250,403	190,202	25,689	42,432	71,397	44,816
New York	79,323	96,921	110,071	99,125	15,507	28,261	31,482	17,820
New Jersey	10,072	10,848	32,890	25,378	2,731	4,064	12,702	7,039
Pennsylvania	18,236	28,301	107,442	65,699	7,451	10,107	27,213	19,957
East North Central	108,781	109,549	209,904	170,740	29,449	33,878	62,203	50,058
Ohio	13,225	20,769	46,160	37,877	3,960	5,868	11,600	12,929
Indiana	11,079	14,893	28,097	26,982	3,198	6,407	11,125	10,467
Illinois	42,072	28,813	64,852	37,087	8,737	9,443	15,741	8,792
Michigan	23,734	25,568	53,503	47,342	8,701	7,831	17,720	16,042
Wisconsin	18,671	19,506	17,292	21,452	4,853	4,329	6,017	1,828
West North Central	43,987	54,398	75,377	90,606	9,783	18,646	29,687	23,643
Minnesota	11,441	13,182	18,893	31,047	3,690	5,341	8,008	5,180
Iowa	12,202	12,728	13,242	14,265	1,851	2,734	4,223	5,163
Missouri	7,344	10,874	23,860	26,310	1,728	5,358	10,546	5,509
North Dakota	1,006	954	2,749	1,003	227	246	848	566
South Dakota	1,581	2,666	2,394	2,745	247	1,070	834	1,041
Nebraska	3,609	8,498	7,959	7,077	751	2,146	3,280	2,748
Kansas	6,804	5,496	6,280	8,159	1,289	1,751	1,948	3,436
South Atlantic	43,886	78,012	129,746	134,811	12,694	24,941	44,707	45,591
Delaware	1,957	767	4,588	3,470	219	498	1,316	401
Maryland	6,855	17,085	16,887	11,963	2,307	6,552	6,043	5,309
District of Columbia	3,757	6,319	11,725	7,259	1,685	2,285	5,563	3,881
Virginia	4,374	7,631	12,597	22,304	663	1,674	4,871	5,282
West Virginia	4,012	2,885	3,822	5,212	1,515	986	1,284	2,388
North Carolina	7,873	15,567	30,789	39,196	1,762	4,362	12,453	16,271
South Carolina	1,134	4,069	5,962	4,859	346	1,054	2,033	1,896
Georgia	4,316	4,316	10,612	20,775	1,478	1,422	3,097	3,067
Florida	9,608	19,373	32,764	19,773	2,719	6,108	8,047	7,096
East South Central	27,956	27,283	45,736	44,011	8,060	8,872	10,582	17,006
Kentucky	2,439	5,086	14,770	17,614	781	1,852	3,017	7,179
Tennessee	11,702	8,403	16,164	7,848	3,394	2,588	3,378	2,470
Alabama	5,901	10,046	10,209	12,635	1,822	2,679	3,023	5,158
Mississippi	7,914	3,748	4,593	5,914	2,063	1,753	1,164	2,199
West South Central	33,797	42,389	88,161	54,009	10,435	15,895	36,296	16,126
Arkansas	1,721	2,217	4,757	2,025	870	887	2,235	667
Louisiana	5,332	6,120	15,168	9,187	2,847	1,730	5,291	3,614
Oklahoma	9,295	2,822	7,538	4,035	1,132	708	1,396	1,211
Texas	17,449	31,230	60,698	38,762	5,586	12,570	27,374	10,634
Mountain	18,274	43,494	61,661	78,545	5,474	12,965	19,822	30,740
Montana	627	1,846	778	2,351	228	459	307	365
Idaho	3,310	937	1,781	1,606	81	206	393	331

East North Central	108,781	109,549	209,904	170,740	29,449	33,878	62,203	50,058
Ohio	13,225	20,769	46,160	37,877	3,960	5,868	11,600	12,929
Indiana	11,079	14,893	28,097	26,982	3,198	6,407	11,125	10,467
Illinois	42,072	28,813	64,852	37,087	8,737	9,443	15,741	8,792
Michigan	23,734	25,568	53,503	47,342	8,701	7,831	17,720	16,042
Wisconsin	18,671	19,506	17,292	21,452	4,853	4,329	6,017	1,828
West North Central	43,987	54,398	75,377	90,606	9,783	18,646	29,687	23,643
Minnesota	11,441	13,182	18,893	31,047	3,690	5,341	8,008	5,180
Iowa	12,202	12,728	13,242	14,265	1,851	2,734	4,223	5,163
Missouri	7,344	10,874	23,860	26,310	1,728	5,358	10,546	5,509
North Dakota	1,006	954	2,749	1,003	227	246	848	566
South Dakota	1,581	2,666	2,394	2,745	247	1,070	834	1,041
Nebraska	3,609	8,498	7,959	7,077	751	2,146	3,280	2,748
Kansas	6,804	5,496	6,280	8,159	1,289	1,751	1,948	3,436
South Atlantic	43,886	78,012	129,746	134,811	12,694	24,941	44,707	45,591
Delaware	1,957	767	4,588	3,470	219	498	1,316	401
Maryland	6,855	17,085	16,887	11,963	2,307	6,552	6,043	5,309
District of Columbia	3,757	6,319	11,725	7,259	1,685	2,285	5,563	3,881
Virginia	4,374	7,631	12,597	22,304	663	1,674	4,871	5,282
West Virginia	4,012	2,885	3,822	5,212	1,515	986	1,284	2,388
North Carolina	7,873	15,567	30,789	39,196	1,762	4,362	12,453	16,271
South Carolina	1,134	4,069	5,962	4,859	346	1,054	2,033	1,896
Georgia	4,316	4,316	10,612	20,775	1,478	1,422	3,097	3,067
Florida	9,608	19,373	32,764	19,773	2,719	6,108	8,047	7,096
East South Central	27,956	27,283	45,736	44,011	8,060	8,872	10,582	17,006
Kentucky	2,439	5,086	14,770	17,614	781	1,852	3,017	7,179
Tennessee	11,702	8,403	16,164	7,848	3,394	2,588	3,378	2,470
Alabama	5,901	10,046	10,209	12,635	1,822	2,679	3,023	5,158
Mississippi	7,914	3,748	4,593	5,914	2,063	1,753	1,164	2,199
West South Central	33,797	42,389	88,161	54,009	10,435	15,895	36,296	16,126
Arkansas	1,721	2,217	4,757	2,025	870	887	2,235	667
Louisiana	5,332	6,120	15,168	9,187	2,847	1,730	5,291	3,614
Oklahoma	9,295	2,822	7,538	4,035	1,132	708	1,396	1,211
Texas	17,449	31,230	60,698	38,762	5,586	12,570	27,374	10,634
Mountain	18,274	43,494	61,661	78,545	5,474	12,965	19,822	30,740
Montana	627	1,846	778	2,351	228	459	307	365
Idaho	3,310	937	1,781	1,606	81	206	393	331
Wyoming	166	540	3,518	4,240	74	195	1,006	1,219
Colorado	6,343	12,461	26,726	38,439	1,471	4,885	7,339	14,413
New Mexico	1,364	9,084	6,562	3,262	818	1,414	2,293	875
Arizona	2,140	14,730	12,646	19,256	721	4,123	4,521	9,949
Utah	3,916	3,150	8,479	7,058	1,849	1,259	3,633	2,948
Nevada	408	746	1,171	2,333	232	424	330	640
Pacific	104,937	129,218	133,823	106,010	19,396	39,694	45,918	35,641
Washington	8,756	11,369	15,239	14,697	2,778	3,298	4,759	2,607
Oregon	4,082	7,605	12,164	8,281	2,407	3,561	5,308	4,517
California	88,948	106,921	99,451	69,660	12,153	30,843	32,499	23,274
Alaska	982	1,935	977	258	352	1,810	403	110
Hawaii	2,169	1,388	5,992	13,114	1,706	182	2,949	5,133
Outlying areas	690	1,418	2,688	1,294	295	519	1,189	166

Table B-36. Capital expenditures for research, development, and instruction in the sciences and engineering in universities and colleges, by field of science and type of institution, 1970

[Dollars in thousands]

Field of science	Total	Institutions granting — Doctorate	Master's	Bachelor's	No science degree
Total	$951,873	$735,333	$83,017	$68,106	$65,417
Engineering	132,623	95,834	6,848	12,415	17,526
Physical and environmental sciences	225,268	161,034	29,756	23,960	10,518
Mathematics	38,160	26,150	4,354	3,923	3,733
Life sciences	418,472	363,258	26,860	15,836	12,518
Psychology	22,036	11,971	3,464	4,643	1,958
Social sciences	62,049	40,694	6,030	6,225	9,100
Other sciences, n.e.c.	53,265	36,392	5,705	1,104	10,064

Table B-37. Percent distribution of selected financial, employment, and educational characteristics of scientific and engineering activities of universities and colleges, by institutional group ranked on the basis of R&D expenditures, 1970

[Dollars in thousands]

Institutional group ranked according to amount of R&D expenditures	Current R&D expenditures[a]			Total expenditures for instruction	Capital expenditures for research, development, and instruction			Scientists and engineers	Degrees granted in the sciences and engineering[b]	
	Total	Federal Government	Other sources		Total	Federal Government	Other sources		Total	Ph.D. or Sc.D.
Total, all institutions	$2,856,427	$1,658,298	$1,198,129	$4,064,163	$951,873	$279,316	$672,557	273,775	304,918	15,839
	Percent distribution									
First 10	21.9	24.2	18.7	11.3	8.8	7.2	9.5	10.8	8.8	21.0
Second 10	13.9	15.7	11.5	8.1	10.7	11.3	10.4	8.1	6.6	15.4
Third 10	10.5	11.0	9.8	5.8	8.3	8.1	8.4	6.0	5.4	10.3
Fourth 10	7.8	7.8	7.8	4.3	5.3	7.4	4.5	4.8	4.3	8.3
Fifth 10	6.4	6.4	6.3	3.9	6.1	9.5	4.7	3.9	3.7	6.7
Sixth 10	5.5	5.5	5.5	5.1	5.4	5.0	5.6	3.7	3.5	7.9
Seventh 10	4.7	3.9	5.9	3.1	3.6	3.8	3.6	3.2	3.5	4.9
Eighth 10	4.0	4.1	3.8	2.7	1.6	2.1	1.4	2.5	2.9	4.5
Ninth 10	3.4	3.3	3.6	1.7	2.1	2.7	1.9	2.6	1.6	2.6
Tenth 10	2.9	2.9	2.9	2.5	6.0	6.3	5.9	2.1	1.8	2.6
First 100	81.0	84.8	75.8	48.5	58.0	63.2	55.8	47.8	42.0	84.1
All other institutions	19.0	15.2	24.3	51.5	42.0	36.8	44.2	52.2	58.0	15.9

[a]Includes an estimated $500 million in departmental research.

[b]Excludes first-professional doctorates in medical and health-related fields (M.D., D.D.S., etc.)

APPENDIX B

Reproduction of Survey Form

NSF FORM 411, November 1970

OMB No. 99–R0263
Approval expires December 31, 1971

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC ACTIVITIES OF INSTITUTIONS OF HIGHER EDUCATION, 1971

Organizations are requested to complete and return this form to:

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

Name and address of institution:
(Please correct if name or address has changed)

(Includes aggregate data from 2,198 universities and colleges and 105 medical schools, but excludes 35 university-administered FFRDC's)

The survey questionnaire requests two types of information on the scientific and engineering activities of your institution: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction.

Please read the enclosed instructions before completing this form. Where exact data are not available, estimates are acceptable. Enter "O" as a total rather than leave an item blank.

The data requested in this questionnaire will be published as statistical totals or aggregates for all institutions or for selected groups of institutions. In certain instances, however, the National Science Foundation may wish to publish selected survey data with the institution

Federally Funded Research and Development Centers, as designated by Federal agencies,

Schools of medicine (note that data for medical schools should also be included on form 411)

If your institution has such separately organized units as defined on page 2 of the Instructions and has not received the appropriate forms, these forms will be furnished upon request.

This survey is intended to include institutions in the United States and its outlying areas. Exclude financial and personnel data related specifically to scientific activities carried out by organizational units of the institution located abroad.

Although Form 411 is intended to be used to report data for the institution as a whole, it is

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

(Includes aggregate data from 2,198 universities and colleges and 105 medical schools, but excludes 35 university-administered FFRDC's)

The survey questionnaire requests two types of information on the scientific and engineering activities of your institution: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction.

Please read the enclosed instructions before completing this form. Where exact data are not available, estimates are acceptable. Enter "O" as a total rather than leave an item blank.

The data requested in this questionnaire will be published as statistical totals or aggregates for all institutions or for selected groups of institutions. In certain instances, however, the National Science Foundation may wish to publish selected survey data with the institution identified. Please indicate below the number of any item that should not be published with institutional identification:

_____

In addition to completing this questionnaire for the institution as a whole, a limited number of institutions are requested to report data for certain of their organizational units. Separate blue questionnaires (NSF Form 412) should be used to report data for the following organizational units:

Federally Funded Research and Development Centers, as designated by Federal agencies,
Schools of medicine (note that data for medical schools should also be included on form 411)

If your institution has such separately organized units as defined on page 2 of the Instructions and has not received the appropriate forms, these forms will be furnished upon request.

This survey is intended to include institutions in the United States and its outlying areas. Exclude financial and personnel data related specifically to scientific activities carried out by organizational units of the institution located abroad.

Although Form 411 is intended to be used to report data for the institution as a whole, it is recognized that some institutions may find it convenient to submit separate reports for branches or other organizational units. If your institution prefers to submit separate reports for branches or other organizational units rather than a single report covering the entire institution, list below all branches or other organizational units of your institution which have been excluded from this report and for which separate reports are being submitted:

_____

_____

_____

PART I—PERSONNEL DATA

(Includes items 1 to 6 of the survey questionnaire)

Personnel data are to be reported as of January 1971 or as close as possible thereto.

SECTION A. NUMBER OF SCIENTISTS AND ENGINEERS

(NOTE: Figures on graduate students engaged part time as scientists and engineers should be reported in Section B).

Item 1. Full-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0110	23,039	17,662	4,480	897
(1) Aeronautical engineers	0111	1,305	893	379	33
(2) Chemical engineers	0112	1,610	1,253	301	56
(3) Civil engineers	0113	3,484	2,971	407	106
(4) Electrical engineers	0114	5,745	4,311	1,288	146
(5) Mechanical engineers	0115	4,537	3,845	592	100
(6) Other engineers	0116	6,358	4,389	1,513	456
b. Physical scientists (total)	0120	32,098	25,012	6,533	553
(1) Chemists	0121	13,167	10,643	2,315	209
(2) Earth scientists	0122	5,752	4,432	1,185	135
(3) Physicists	0123	11,045	8,697	2,187	161
(4) Other physical scientists	0124	2,134	1,240	846	48
c. Mathematicians (total)	0130	20,282	18,583	1,316	383
d. Life scientists (total)	0140	85,907	46,276	24,409	15,222
(1) Agricultural scientists	0141	16,334	3,460	5,044	7,830
(2) Biological scientists	0142	27,857	19,897	7,182	778
(3) Medical scientists	0143	41,716	22,919	12,183	6,614
e. Psychologists (total)	0150	12,994	11,149	943	902
f. Social scientists (total)	0160	48,735	42,730	2,855	3,150
(1) Economists	0161	9,507	8,088	1,029	390
(2) Sociologists	0162	8,824	8,160	473	191
(3) Political scientists	0163	7,693	7,161	300	232
(4) Historians	0164	13,639	13,236	233	170
(5) Other social scientists	0165	9,072	6,085	820	2,167
g. Total *(sum of a to f)*	0100	223,055	161,412	40,536	21,107
h. FTE distribution, by function[b]	0190	223,055	155,965	46,158	20,932

		(1)	(2)	(3)	(4)
a. Engineers (total)	0110	23,039	17,662	4,480	897
(1) Aeronautical engineers	0111	1,305	893	379	33
(2) Chemical engineers	0112	1,610	1,253	301	56
(3) Civil engineers	0113	3,484	2,971	407	106
(4) Electrical engineers	0114	5,745	4,311	1,288	146
(5) Mechanical engineers	0115	4,537	3,845	592	100
(6) Other engineers	0116	6,358	4,389	1,513	456
b. Physical scientists (total)	0120	32,098	25,012	6,533	553
(1) Chemists	0121	13,167	10,643	2,315	209
(2) Earth scientists	0122	5,752	4,432	1,185	135
(3) Physicists	0123	11,045	8,697	2,187	161
(4) Other physical scientists	0124	2,134	1,240	846	48
c. Mathematicians (total)	0130	20,282	18,583	1,316	383
d. Life scientists (total)	0140	85,907	46,276	24,409	15,222
(1) Agricultural scientists	0141	16,334	3,460	5,044	7,830
(2) Biological scientists	0142	27,857	19,897	7,182	778
(3) Medical scientists	0143	41,716	22,919	12,183	6,614
e. Psychologists (total)	0150	12,994	11,149	943	902
f. Social scientists (total)	0160	48,735	42,730	2,855	3,150
(1) Economists	0161	9,507	8,088	1,029	390
(2) Sociologists	0162	8,824	8,160	473	191
(3) Political scientists	0163	7,693	7,161	300	232
(4) Historians	0164	13,639	13,236	233	170
(5) Other social scientists	0165	9,072	6,085	820	2,167
g. Total *(sum of a to f)*	0100	223,055	161,412	40,536	21,107
h. FTE distribution, by function[b]	0190	223,055	155,965	46,158	20,932

Item 2. Full-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0210	23,039	12,098	52	7,374	3,515
b. Physical scientists	0220	32,098	22,511	111	7,611	1,865
c. Mathematicians	0230	20,282	9,486	51	9,672	1,073
d. Life scientists	0240	85,907	31,601	29,866	14,156	10,284
e. Psychologists	0250	12,994	8,827	120	3,652	395
f. Social scientists	0260	48,735	26,352	258	19,841	2,284
g. Total *(sum of a to f)*	0200	223,055	110,875	30,458	62,306	19,416

[a]Totals in items 1a to 1g, column 1, *should be the same* as the corresponding totals in items 2a to 2g, column 1.

[b]The total reported in item 1h, column 1, should, by definition, be the same as the total in item 1g, column 1. However, the FTE distribution by function (columns 2, 3, and 4) will not necessarily coincide with the functional distribution on a "primarily employed" basis in item 1g.

Item 3. Part-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971. (Exclude graduate students here but report them in Section B)

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0310	4,091	3,656	359	76
(1) Aeronautical engineers	0311	164	124	39	1
(2) Chemical engineers	0312	233	200	30	3
(3) Civil engineers	0313	645	589	33	23
(4) Electrical engineers	0314	1,140	1,032	95	13
(5) Mechanical engineers	0315	850	788	46	16
(6) Other engineers	0316	1,059	923	116	20
b. Physical scientists (total)	0320	3,845	3,001	781	63
(1) Chemists	0321	1,521	1,235	264	22
(2) Earth scientists	0322	748	557	171	20
(3) Physicists	0323	1,150	912	224	14
(4) Other physical scientists	0324	426	297	122	7
c. Mathematicians (total)	0330	4,266	4,026	130	110
d. Life scientists (total)	0340	24,367	16,214	6,024	2,129
(1) Agricultural scientists	0341	1,705	674	534	497
(2) Biological scientists	0342	3,951	2,944	911	96
(3) Medical scientists	0343	18,711	12,596	4,579	1,536
e. Psychologists (total)	0350	3,812	3,311	270	231
f. Social scientists (total)	0360	10,339	8,697	444	1,198
(1) Economists	0361	1,756	1,600	100	56
(2) Sociologists	0362	2,499	2,340	94	65
(3) Political scientists	0363	1,245	1,177	25	43
(4) Historians	0364	2,232	2,115	43	74
(5) Other social scientists	0365	2,607	1,465	182	960
g. Total *(sum of a to f)*	0300	50,720	38,905	8,008	3,807
h. FTE distribution, by function[b]	0390	19,658	14,859	3,593	1,206

Item 4. Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.

FIELD OF EMPLOYMENT	TOTAL[a]	PH.D. OR	M.D., D.D.S.	MASTER'S	BACHELOR'S OR [illegible]

(6) Other engineers	0316	1,059	923	116	20
b. Physical scientists (total)	0320	3,845	3,001	781	63
(1) Chemists	0321	1,521	1,235	264	22
(2) Earth scientists	0322	748	557	171	20
(3) Physicists	0323	1,150	912	224	14
(4) Other physical scientists	0324	426	297	122	7
c. Mathematicians (total)	0330	4,266	4,026	130	110
d. Life scientists (total)	0340	24,367	16,214	6,024	2,129
(1) Agricultural scientists	0341	1,705	674	534	497
(2) Biological scientists	0342	3,951	2,944	911	96
(3) Medical scientists	0343	18,711	12,596	4,579	1,536
e. Psychologists (total)	0350	3,812	3,311	270	231
f. Social scientists (total)	0360	10,339	8,697	444	1,198
(1) Economists	0361	1,756	1,600	100	56
(2) Sociologists	0362	2,499	2,340	94	65
(3) Political scientists	0363	1,245	1,177	25	43
(4) Historians	0364	2,232	2,115	43	74
(5) Other social scientists	0365	2,607	1,465	182	960
g. Total *(sum of a to f)*	0300	50,720	38,905	8,008	3,807
h. FTE distribution, by function[b]	0390	19,658	14,859	3,593	1,206

Item 4. **Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.**

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0410	4,091	1,223	20	1,748	1,100
b. Physical scientists	0420	3,845	1,748	23	1,489	585
c. Mathematicians	0430	4,266	766	18	2,755	727
d. Life scientists	0440	24,367	4,421	15,773	2,747	1,426
e. Psychologists	0450	3,812	1,800	92	1,627	293
f. Social scientists	0460	10,339	2,641	145	6,267	1,286
g. Total *(sum of a to f)*	0400	50,720	12,599	16,071	16,633	5,417

[a]Totals in items 3a to 3g, column 1, *should be the same* as the corresponding totals in items 4a to 4g, column 1.
[b]The totals in item 3h converting figures on part-time employment into FTE's will necessarily differ from head-count totals in item 3g.

SECTION B. NUMBER OF GRADUATE STUDENTS ENGAGED PART TIME AS SCIENTISTS AND ENGINEERS

Item 5. Graduate students receiving compensation for part-time services as scientists and engineers at your institution, by field and function in which primarily engaged; and total FTE's, by function, January 1971.

FIELD OF EMPLOYMENT		TOTAL (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0510	15,300	5,877	8,899	524
(1) Aeronautical engineers	0511	875	273	577	25
(2) Chemical engineers	0512	1,798	727	986	85
(3) Civil engineers	0513	2,104	714	1,248	142
(4) Electrical engineers	0514	3,651	1,620	1,982	49
(5) Mechanical engineers	0515	2,373	1,028	1,278	67
(6) Other engineers	0516	4,499	1,515	2,828	156
b. Physical scientists (total)	0520	24,433	13,507	10,471	455
(1) Chemists	0521	10,931	6,991	3,793	147
(2) Earth scientists	0522	4,120	2,145	1,847	128
(3) Physicists	0523	7,941	4,058	3,761	122
(4) Other physical scientists	0524	1,441	313	1,070	58
c. Mathematicians (total)	0530	8,391	6,586	1,472	333
d. Life scientists (total)	0540	23,157	11,180	11,213	764
(1) Agricultural scientists	0541	4,951	1,244	3,491	216
(2) Biological scientists	0542	13,199	7,501	5,387	311
(3) Medical scientists	0543	5,007	2,435	2,335	237
e. Psychologists (total)	0550	6,470	3,758	2,240	472
f. Social scientists (total)	0560	16,510	11,373	4,098	1,039
(1) Economists	0561	3,603	2,262	213	128
(2) Sociologists	0562	2,859	1,989	730	140
(3) Political scientists	0563	2,360	1,688	513	159
(4) Historians	0564	3,897	3,124	534	239
(5) Other social scientists	0565	3,791	2,310	1,108	373
g. Total *(sum of a to f)*	0500	94,261	52,281	38,393	3,587
h. FTE distribution, by function*	0590	42,991	22,818	18,598	1,575

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. Technicians, by field and function in which primarily employed, January 1971

FIELD OF EMPLOYMENT	TOTAL (1)	R & D (2)	OTHER ACTIVITIES (3)

(6) Other engineers	[illegible]	4,499	1,919	[illegible]	[illegible]
b. Physical scientists (total)	0520	24,433	13,507	10,471	455
(1) Chemists	0521	10,931	6,991	3,793	147
(2) Earth scientists	0522	4,120	2,145	1,847	128
(3) Physicists	0523	7,941	4,058	3,761	122
(4) Other physical scientists	0524	1,441	313	1,070	58
c. Mathematicians (total)	0530	8,391	6,586	1,472	333
d. Life scientists (total)	0540	23,157	11,180	11,213	764
(1) Agricultural scientists	0541	4,951	1,244	3,491	216
(2) Biological scientists	0542	13,199	7,501	5,387	311
(3) Medical scientists	0543	5,007	2,435	2,335	237
e. Psychologists (total)	0550	6,470	3,758	2,240	472
f. Social scientists (total)	0560	16,510	11,373	4,098	1,039
(1) Economists	0561	3,603	2,262	1,213	128
(2) Sociologists	0562	2,859	1,989	730	140
(3) Political scientists	0563	2,360	1,688	513	159
(4) Historians	0564	3,897	3,124	534	239
(5) Other social scientists	0565	3,791	2,310	1,108	373
g. Total *(sum of a to f)*	0500	94,261	52,281	38,393	3,587
h. FTE distribution, by function*	0590	42,991	22,818	18,598	1,575

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. Technicians, by field and function in which primarily employed, January 1971

FIELD OF EMPLOYMENT		TOTAL (1)	R & D (2)	OTHER ACTIVITIES (3)
a. Engineering technicians	0610	5,672	3,585	2,087
b. Physical science technicians	0620	5,220	3,321	1,899
c. Biological science technicians (include agricultural)	0630	13,057	10,096	2,961
d. Medical and health-related technicians	0640	20,505	14,001	6,504
e. Social science technicians	0650	1,559	906	653
f. Total *(sum of a to e)*	0600	46,013	31,909	14,104

PART II—FINANCIAL DATA

(Includes items 7 to 13 of the survey questionnaire)

FINANCIAL DATA REPORTED IN PART II ARE FOR THE FISCAL YEAR, WHICH BEGAN ON JULY 1, 1969 AND ENDED ON JUNE 30, 1970, OR YOUR INSTITUTION'S EQUIVALENT FISCAL YEAR. SPECIFY THE ENDING DATE IF DIFFERENT FROM ABOVE:

_____

ALL FINANCIAL DATA REQUESTED ON THIS FORM SHOULD BE REPORTED IN THOUSANDS OF DOLLARS; FOR EXAMPLE, AN EXPENDITURE OF $25,342 SHOULD BE ROUNDED TO THE NEAREST THOUSAND DOLLARS AND REPORTED IN THE APPROPRIATE COLUMNS AS $25.

_____

*The numbers within parentheses in items 7 through 10 include an estimate for departmental research and other R&D costs for which most universities and colleges do not maintain separate records. The numbers outside the parentheses represent separately-budgeted R&D expenditures as reported by institutions included in the survey. All charts and appendix tables include estimates for nonseparately budgeted R&D expenditures.

*In item 11 the numbers within parentheses represent [illegible]

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ALL FINANCIAL DATA REQUESTED ON THIS FORM SHOULD BE REPORTED IN THOUSANDS OF DOLLARS; FOR EXAMPLE, AN EXPENDITURE OF $25,342 SHOULD BE ROUNDED TO THE NEAREST THOUSAND DOLLARS AND REPORTED IN THE APPROPRIATE COLUMNS AS $25.

*The numbers within parentheses in items 7 through 10 include an estimate for departmental research and other R&D costs for which most universities and colleges do not maintain separate records. The numbers outside the parentheses represent separately-budgeted R&D expenditures as reported by institutions included in the survey. All charts and appendix tables include estimates for nonseparately budgeted R&D expenditures.

*In item 11 the numbers within parentheses represent both direct and indirect costs for instruction. These numbers exclude estimates for departmental research but include indirect costs in item 12 associated with instruction. The numbers outside the parentheses represent total direct expenditures for instruction and departmental research as reported by survey respondents. All charts and appendix tables represent total instruction expenditures.

SECTION D

CURRENT EXPENDITURES FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT (R&D)

If your institution did not have any current expenditures for separately budgeted research and development in 1969-70 check "none" in the space provided here and skip to Section E. ☐ None.

(Exclude expenditures for capital equipment and facilities.)

Item 7. **Current expenditures for separately budgeted research and development, by source of funds, 1969-70**

SOURCE OF FUNDS		THOUSANDS OF DOLLARS	INTERNAL USE ONLY
a. Federal Government	0710	$1,658,298	equals 8d and 9d (Col. 2)
b. State government	0720	261,010	
c. Local government	0730	11,931	
d. Foundations	0740	75,809	
e. Voluntary health agencies	0750	36,067	
f. Industry	0760	61,633	
g. Institution's own funds	0770	197,092 (696,747)*	
h. Other sources	0780	54,932	
i. Total *(sum of a to h)*[a]	0700	$2,356,772 (2,856,427)*	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Direct wages and salaries	0810	$1,297,438 (1,597,013)*	$ 870,445
b. All other direct costs (including materials and supplies)	0820	728,477 (778,511)*	512,632
c. Indirect costs reimbursed or reimbursable	0830	330,857 (480,903)*	275,221
d. Total *(sum of a to c)*[a]	0800	$2,356,772 (2,856,427)*	$ 1,658,298

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

TYPE OF R&D ACTIVITY	THOUSANDS OF DOLLARS	
	TOTAL	FEDERAL GOVERNMENT

d. Foundations	0740	75,809		
e. Voluntary health agencies	0750	36,067		
f. Industry	0760	61,633		
g. Institution's own funds	0770	197,092	(696,747)*	
h. Other sources	0780	54,932		
i. Total *(sum of a to h)*[a]	0700	$ 2,356,772	(2,856,427)*	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS		
		TOTAL (1)		FEDERAL GOVERNMENT (2)
a. Direct wages and salaries	0810	$ 1,297,438	(1,597,013)*	$ 870,445
b. All other direct costs (including materials and supplies)	0820	728,477	(778,511)*	512,632
c. Indirect costs reimbursed or reimbursable	0830	330,857	(480,903)*	275,221
d. Total *(sum of a to c)*[a]	0800	$ 2,356,772	(2,856,427)*	$ 1,658,298

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

TYPE OF R&D ACTIVITY		THOUSANDS OF DOLLARS		
		TOTAL (1)		FEDERAL GOVERNMENT (2)
a. Basic research	0910	$ 1,787,806	(2,185,657)*	$ 1,288,630
b. Applied research	0920	424,772	(526,576)*	266,083
c. Development	0930	144,194		103,585
d. Total *(sum of a to c)*[a]	0900	$ 2,356,772	(2,856,427)*	$ 1,658,298

*Totals in items 7i, 8d (Col. 1) and 9d (Col. 1) should be identical. Similarly, figures reported in items 7a, 8d (Col. 2) and 9d (Col. 2) should be identical. If figures for the foregoing items are not consistent, please give reasons in "Remarks" at the end of the questionnaire.

Item 10. **Total and federally financed current expenditures for separately budgeted basic and applied research, by field of science, 1969-70**

FIELD OF SCIENCE		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Engineering (total)	1010	$ 279,724 (346,427)*	$ 212,538
b. Physical sciences (total)	1020	$ 315,181 (368,789)*	$ 264,649
(1) Astronomy	1021	17,027 (19,681)*	14,612
(2) Chemistry	1022	101,037 (119,578)*	78,649
(3) Physics	1023	164,699 (191,336)*	147,871
(4) Physical sciences, NEC	1024	32,418 (38,194)*	23,517
c. Environmental sciences (total)	1030	$ 111,876 (130,277)*	$ 79,648
d. Mathematics (total)	1040	$ 65,112 (102,444)*	$ 47,667
e. Life sciences (total)	1050	$1,129,491 (1,311,366)*	$ 767,053
(1) Biological	1051	479,076 (559,306)*	299,045
(2) Clinical medical	1052	530,132 (612,807)*	413,788
(3) Life sciences, NEC	1053	120,283 (139,253)*	54,220
f. Psychology (total)	1060	$ 56,413 (79,532)*	$ 45,005
(1) Biological aspects	1061	14,098 (19,822)*	10,990
(2) Social aspects	1062	25,462 (36,105)*	20,979
(3) Psychological sciences, NEC	1063	16,853 (23,605)*	13,036
g. Social sciences (total)	1070	$ 166,711 (272,982)*	$ 93,112
(1) Economics	1071	38,009 (60,613)*	17,146
(2) Political science	1072	16,160 (26,868)*	7,282
(3) Sociology	1073	42,780 (69,007)*	25,346
(4) Social sciences, NEC	1074	69,762 (116,494)*	43,338
h. Other sciences, NEC (total)	1080	$ 88,070 (100,416)*	$ 45,041
i. Total (*sum of a to h*)*	1000	$ 2,212,578 (2,712,233)*	$ 1,554,713

* If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E
CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. **Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70**

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)	INTERNAL USE ONLY
a. Engineering	[illegible]	[illegible]	

(4) Physical sciences, NEC	1024	32,418	(38,194)*	23,517
c. Environmental sciences (total)	1030	$ 111,876	(130,277)*	$ 79,648
d. Mathematics (total)	1040	$ 65,112	(102,444)*	$ 47,667
e. Life sciences (total)	1050	$1,129,491	(1,311,366)*	$ 767,053
(1) Biological	1051	479,076	(559,306)*	299,045
(2) Clinical medical	1052	530,132	(612,807)*	413,788
(3) Life sciences, NEC	1053	120,283	(139,253)*	54,220
f. Psychology (total)	1060	$ 56,413	(79,532)*	$ 45,005
(1) Biological aspects	1061	14,098	(19,822)*	10,990
(2) Social aspects	1062	25,462	(36,105)*	20,979
(3) Psychological sciences, NEC	1063	16,853	(23,605)*	13,036
g. Social sciences (total)	1070	$ 166,711	(272,982)*	$ 93,112
(1) Economics	1071	38,009	(60,613)*	17,146
(2) Political science	1072	16,160	(26,868)*	7,282
(3) Sociology	1073	42,780	(69,007)*	25,346
(4) Social sciences, NEC	1074	69,762	(116,494)*	43,338
h. Other sciences, NEC (total)	1080	$ 88,070	(100,416)*	$ 45,041
i. Total (*sum of a to h*)[a]	1000	$ 2,212,578	(2,712,233)*	$ 1,554,713

[a] If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E
CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. **Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70**

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)		INTERNAL USE ONLY
a. Engineering	1110	$ 416,680	(512,828)*	
b. Physical and environmental sciences	1120	506,011	(622,042)*	
c. Mathematics	1130	293,668	(366,649)*	
d. Life sciences	1140	1,090,242	(1,286,674)*	
e. Psychology	1150	183,921	(228,120)*	
f. Social sciences	1160	765,357	(939,110)*	
g. Other sciences, NEC	1170	90,976	(108,740)*	
h. Total (*sum of a to g*)	1100	$ 3,346,855	(4,064,163)*	

Item 12. **Estimate the dollar amount of overhead or indirect costs allocable to the instruction and departmental research activities reported above (item 11)**

1200 — THOUSANDS OF DOLLARS: $ 1,216,963

SECTION F

CAPITAL EXPENDITURES FOR SCIENTIFIC AND ENGINEERING FACILITIES AND EQUIPMENT FOR RESEARCH, DEVELOPMENT, AND INSTRUCTION

Item 13. Capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction, by field of science, source of funds, and purpose, 1969-70.

Prorate any expenditures intended for use in two or more fields of science and for R&D and graduate and undergraduate instruction. Do not include any materials and supplies reported under current expenditures in Section D or Section E. Include current fund expenditures for equipment and facilities as well as plant and other funds.

	FIELD OF SCIENCE		SOURCE OF FUNDS (THOUSANDS OF DOLLARS)			
			TOTAL (1)	FEDERAL GOVERNMENT (2)	STATE AND LOCAL GOVERNMENT (3)	OTHER SOURCES (4)
13.1	All purposes (total)					
	a. Engineering	1310	$ 132,623	$ 38,263	54,417	39,943
	b. Physical and environmental sciences	1320	225,268	63,107	101,013	61,148
	c. Mathematics	1330	38,160	9,536	17,015	11,609
	d. Life sciences	1340	418,472	142,718	173,569	102,185
	e. Psychology	1350	22,036	4,848	11,295	5,893
	f. Social sciences	1360	62,049	10,303	36,738	15,008
	g. Other sciences, NEC	1370	53,265	10,541	26,020	16,704
	h. Total *(sum of a to g)*	1300	$ 951,873	$ 279,316	420,067	252,490
13.2	Research and development and/or graduate instruction					
	a. Engineering	1311	$ 53,348	$ 18,162	15,634	19,552
	b. Physical and environmental sciences	1321	103,703	32,010	43,597	28,096
	c. Mathematics	1331	14,481	4,128	5,668	4,685
	d. Life sciences	1341	291,648	115,186	108,627	67,835
	e. Psychology	1351	7,120	2,061	3,504	1,555
	f. Social sciences	1361	18,601	3,449	9,722	5,430
	g. Other sciences, NEC	1371	16,984	4,722	5,483	6,779
	h. Total *(sum of a to g)*	1301	$ 505,885	$ 179,718	192,235	133,932
13.3	Undergraduate instruction					
	a. Engineering	1312	$ 79,275	$ 20,101	38,783	20,391
	b. Physical and environmental sciences	1322	121,565	31,097	57,416	33,052
	c. Mathematics	1332	23,679	5,408	11,347	6,924
	d. Life sciences	1342	126,824	27,532	64,942	34,350
	e. Psychology	1352	14,916	2,787	7,791	4,338
	f. Social sciences	1362	43,448	6,854	27,016	9,578
	g. Other sciences, NEC	1372	36,281	5,819	20,537	9,925

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a. Engineering	1311	$ 53,348	$ 18,162	15,634	19,552
b. Physical and environmental sciences	1321	103,703	32,010	43,597	28,096
c. Mathematics	1331	14,481	4,128	5,668	4,685
d. Life sciences	1341	291,648	115,186	108,627	67,835
e. Psychology	1351	7,120	2,061	3,504	1,555
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g. Other sciences, NEC	1371	16,984	4,722	5,483	6,779
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13.3	**Undergraduate instruction**				
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b. Physical and environmental sciences	1322	121,565	31,097	57,416	33,052
c. Mathematics	1332	23,679	5,408	11,347	6,924
d. Life sciences	1342	126,824	27,532	64,942	34,350
e. Psychology	1352	14,916	2,787	7,791	4,338
f. Social sciences	1362	43,448	6,854	27,016	9,578
g. Other sciences, NEC	1372	36,281	5,819	20,537	9,925
h. Total *(sum of a to g)*	1302	$ 445,988	$ 99,598	227,832	118,558

REMARKS: *If additional space is needed, attach an extra page.*

NAME OF PERSON SUBMITTING THIS FORM	TITLE
NAME OF INSTITUTION	ADDRESS *(number, street, city, state, ZIP code)*
AREA CODE, TELEPHONE NO., EXT. / DATE	

Appendix C

Statistical Tables

Medical Schools

C-1. Selected employment characteristics of scientists in medical schools, 1965-71 62

C-2. Number of scientists employed in medical schools, by geographic division, 1965, 1967, 1969, and 1971 62

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C-5. Current R&D expenditures in medical schools, 1964, 1966, 1968, and 1970 64

List of Medical Schools Included in Survey

ALABAMA: University of Alabama Medical Center.

ARIZONA: University of Arizona College of Medicine.

ARKANSAS: University of Arkansas Medical Center.

CALIFORNIA:
- Loma Linda University School of Medicine.
- Stanford University School of Medicine.
- University of California School of Medicine (Davis).
- University of California College of Medicine (Irvine).
- University of California School of Medicine (San Diego).
- University of California School of Medicine (Los Angeles).
- University of California School of Medicine (San Francisco).
- University of Southern California School of Medicine.

COLORADO: University of Colorado Medical Center.

CONNECTICUT:
- University of Connecticut Health Center.
- Yale University School of Medicine.

DISTRICT OF COLUMBIA:
- Georgetown University School of Medicine.
- George Washington University School of Medicine.
- Howard University College of Medicine.

FLORIDA:
- University of Florida College of Medicine.
- University of Miami School of Medicine.
- University of South Florida College of Medicine.

GEORGIA:
- Emory University School of Medicine.
- Medical College of Georgia.

HAWAII: University of Hawaii School of Medicine.

ILLINOIS:
- Chicago Medical School.
- Loyola University, Stritch School of Medicine.
- Northwestern University Medical School.
- University of Chicago, Pritzker School of Medicine.
- University of Illinois Medical Center.

INDIANA: Indiana University School of Medicine.

IOWA: University of Iowa College of Medicine.

KANSAS: University of Kansas Medical Center.

KENTUCKY:
- University of Kentucky College of Medicine.
- University of Louisville School of Medicine.

LOUISIANA:
- Louisiana State University Medical Center (New Orleans).
- Tulane University School of Medicine.

MARYLAND:
- Johns Hopkins University School of Medicine.
- University of Maryland School of Medicine.

MASSACHUSET
- Boston Univer
- Harvard Medi
- Tufts Universi

MICHIGAN:
- Michigan Stat
- University of
- Wayne State U

MINNESOTA: U

MISSISSIPPI: U

MISSOURI:
- St. Louis Univ
- University of
- University of
- Washington U

NEBRASKA:
- Creighton Un
- University of

NEW HAMPSHIR

NEW JERSEY:
- New Jersey C
- Rutgers - the

NEW MEXICO:

NEW YORK:
- CUNY - Mt. S
- Columbia Uni
- Cornell Univer
- New York Me
- New York Un
- SUNY - Down
- SUNY - Stony
- SUNY - Upsta
- Albany Medic
- SUNY - Buffa
- University of
- Yeshiva Unive

NORTH CAROL
- Duke Univers
- University of
- Wake Forest C

NORTH DAKOT
- Medicine.

OHIO:
- Case-Western
- Medical Colleg
- Ohio State Un
- University of

List of Medical Schools Included in Survey

ALABAMA: University of Alabama Medical Center.

ARIZONA: University of Arizona College of Medicine.

ARKANSAS: University of Arkansas Medical Center.

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- Loma Linda University School of Medicine.
- Stanford University School of Medicine.
- University of California School of Medicine (Davis).
- University of California College of Medicine (Irvine).
- University of California School of Medicine (San Diego).
- University of California School of Medicine (Los Angeles).
- University of California School of Medicine (San Francisco).
- University of Southern California School of Medicine.

COLORADO: University of Colorado Medical Center.

CONNECTICUT:
- University of Connecticut Health Center.
- Yale University School of Medicine.

DISTRICT OF COLUMBIA:
- Georgetown University School of Medicine.
- George Washington University School of Medicine.
- Howard University College of Medicine.

FLORIDA:
- University of Florida College of Medicine.
- University of Miami School of Medicine.
- University of South Florida College of Medicine.

GEORGIA:
- Emory University School of Medicine.
- Medical College of Georgia.

HAWAII: University of Hawaii School of Medicine.

ILLINOIS:
- Chicago Medical School.
- Loyola University, Stritch School of Medicine.
- Northwestern University Medical School.
- University of Chicago, Pritzker School of Medicine.
- University of Illinois Medical Center.

INDIANA: Indiana University School of Medicine.

IOWA: University of Iowa College of Medicine.

KANSAS: University of Kansas Medical Center.

KENTUCKY:
- University of Kentucky College of Medicine.
- University of Louisville School of Medicine.

LOUISIANA:
- Louisiana State University Medical Center (New Orleans).
- Tulane University School of Medicine.

MARYLAND:
- Johns Hopkins University School of Medicine.
- University of Maryland School of Medicine.

MASSACHUSETTS:
- Boston University School of Medicine.
- Harvard Medical School.
- Tufts University School of Medicine.

MICHIGAN:
- Michigan State University College of Human Medicine.
- University of Michigan Medical School.
- Wayne State University School of Medicine.

MINNESOTA: University of Minnesota Medical School.

MISSISSIPPI: University of Mississippi School of Medicine.

MISSOURI:
- St. Louis University School of Medicine.
- University of Missouri Medical Center (Columbia).
- University of Missouri School of Medicine (Kansas City).
- Washington University School of Medicine.

NEBRASKA:
- Creighton University School of Medicine.
- University of Nebraska Medical Center.

NEW HAMPSHIRE: Dartmouth Medical School.

NEW JERSEY:
- New Jersey College of Medicine and Dentistry.
- Rutgers - the State University Medical School.

NEW MEXICO: University of New Mexico School of Medicine.

NEW YORK:
- CUNY - Mt. Sinai School of Medicine.
- Columbia University, College of Physicians and Surgeons.
- Cornell University Medical College.
- New York Medical College.
- New York University Medical Center.
- SUNY - Downstate Medical Center.
- SUNY - Stony Brook School of Medicine.
- SUNY - Upstate Medical Center.
- Albany Medical College of Union University.
- SUNY - Buffalo School of Medicine.
- University of Rochester School of Medicine and Dentistry.
- Yeshiva University, Albert Einstein College of Medicine.

NORTH CAROLINA:
- Duke University School of Medicine.
- University of North Carolina School of Medicine.
- Wake Forest College, Bowman Gray School of Medicine.

NORTH DAKOTA: University of North Dakota School of Medicine.

OHIO:
- Case-Western Reserve University School of Medicine.
- Medical College of Ohio.
- Ohio State University College of Medicine.
- University of Cincinnati College of Medicine.

OKLAHOMA: University of Oklahoma Medical Center.

OREGON: University of Oregon Medical School.

PENNSYLVANIA:
- Hahneman Medical College of Philadelphia.
- Thomas Jefferson University and Hospital.
- Pennsylvania State University, Milton S. Hershey Medical Center.
- Temple University School of Medicine.
- University of Pennsylvania School of Medicine.
- University of Pittsburgh School of Medicine.
- The Medical College of Pennsylvania.

RHODE ISLAND: Brown University, Program in Medical Science.

SOUTH CAROLINA: Medical University of South Carolina.

SOUTH DAKOTA: University of South Dakota School of Medicine.

TENNESSEE:
- Meharry Medical College.
- University of Tennessee College of Medicine.
- Vanderbilt University School of Medicine.

TEXAS:
- Baylor College of Medicine.
- University of Texas, M. D. Anderson Hospital and Tumor Institute.
- University of Texas Medical School (San Antonio).
- University of Texas, Southwestern Medical School (Dallas).
- University of Texas Medical Branch (Galveston).
- University of Texas Medical School (Houston)

UTAH: University of Utah College of Medicine.

VERMONT: University of Vermont College of Medicine.

VIRGINIA:
- Virginia Commonwealth University Medical College
- University of Virginia School of Medicine.

WASHINGTON: University of Washington School of Medicine.

WEST VIRGINIA: West Virginia University School of Medicine.

WISCONSIN:
- Medical College of Wisconsin.
- University of Wisconsin Medical School.

PUERTO RICO: University of Puerto Rico, Medical Sciences Campus

Table C-1. Selected employment characteristics of scien

Item	January 1965		January 19	
	Number	Percent distribution	Number	Pe distr
Number of scientists	38,394	100.0	43,808	10
Employment status:				
Full time	25,552	66.6	30,332	
Part time	12,842	33.4	13,476	
Field of employment:				
Biological scientists	7,154	18.6	7,563	
Medical scientists	30,722	80.0	35,531	
All other scientists	518	1.4	714	
Educational attainment:				
Ph. D.	(a)	(a)	7,647	
M.D., D.D.S., etc.	(a)	(a)	31,035	
Master's	(a)	(a)	2,169	
Bachelor's	(a)	(a)	2,957	
FTE scientists	29,970	100.0	34,964	1
Function:				
Teaching	11,780	39.3	14,843	
Research and development	12,983	43.3	13,821	
Other activities	5,207	17.4	6,300	

[a]Not available.

Table C-2. Number of scientists employed in medical schools, by ge

Geographic division	January 1965[a]		January 19	
	Number	Percent distribution	Number	Pe dist
United States, total	38,394	100.0	43,808	1
New England	3,264	8.5	3,578	
Middle Atlantic	11,620	30.3	13,227	
East North Central	6,435	16.8	7,076	
West North Central	1,646	4.3	3,071	
South Atlantic	6,346	16.5	6,738	
East South Central	1,592	4.1	1,873	
West South Central	2,369	6.2	2,698	
Mountain	832	2.2	1,167	
Pacific	3,667	9.6	3,743	
Outlying areas	623	1.6	637	

[a]Revised to exclude health-professionals working primarily on patient care.

Table C-1. Selected employment characteristics of scientists in medical schools, 1965-71

Item	January 1965		January 1967		January 1969		January 1971	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Number of scientists	38,394	100.0	43,808	100.0	49,792	100.0	56,034	100.0
Employment status:								
Full time	25,552	66.6	30,332	69.2	34,826	69.9	39,831	71.1
Part time	12,842	33.4	13,476	30.8	14,966	30.1	16,203	28.9
Field of employment:								
Biological scientists	7,154	18.6	7,563	17.3	7,692	15.4	8,561	15.3
Medical scientists	30,722	80.0	35,531	81.1	41,064	82.5	46,464	82.9
All other scientists	518	1.4	714	1.6	1,036	2.1	1,009	1.8
Educational attainment:								
Ph. D.	(a)	(a)	7,647	17.4	9,751	19.6	11,191	20.0
M.D., D.D.S., etc.	(a)	(a)	31,035	70.8	34,896	70.1	38,403	68.5
Master's	(a)	(a)	2,169	5.0	2,192	4.4	3,488	6.2
Bachelor's	(a)	(a)	2,957	6.8	2,953	5.9	2,952	5.3
FTE scientists	29,970	100.0	34,964	100.0	40,027	100.0	45,488	100.0
Function:								
Teaching	11,780	39.3	14,843	42.5	17,416	43.5	22,231	48.9
Research and development	12,983	43.3	13,821	39.5	15,581	38.9	16,335	35.9
Other activities	5,207	17.4	6,300	18.0	7,030	17.6	6,922	15.2

[a]Not available.

Table C-2. Number of scientists employed in medical schools, by geographic division, 1965, 1967, 1969, and 1971

Geographic division	January 1965[a]		January 1967[a]		January 1969[a]		January 1971	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
United States, total	38,394	100.0	43,808	100.0	49,792	100.0	56,034	100.0
New England	3,264	8.5	3,578	8.2	4,277	8.6	5,335	9.5
Middle Atlantic	11,620	30.3	13,227	30.2	14,706	29.5	15,659	27.9
East North Central	6,435	16.8	7,076	16.2	8,171	16.4	9,340	16.7
West North Central	1,646	4.3	3,071	7.0	3,268	6.6	3,875	6.9
South Atlantic	6,346	16.5	6,738	15.4	7,033	14.1	7,700	13.7
East South Central	1,592	4.1	1,873	4.3	2,230	4.5	2,291	4.1
West South Central	2,369	6.2	2,698	6.2	3,416	6.9	4,013	7.2
Mountain	832	2.2	1,167	2.7	1,327	2.7	1,294	2.3
Pacific	3,667	9.6	3,743	8.5	4,746	9.5	5,917	10.6
Outlying areas	623	1.6	637	1.5	618	1.2	610	1.1

[a]Revised to exclude health-professionals working primarily on patient care.

Table C-3. Selected characteristics of graduate students receiving compensation for part-time services as scientists in medical schools, by field and function, January 1965, 1967, 1969, and 1971

Field of employment and function	January 1965		January 1967		January 1969		January 1971	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Number of graduate students	3,425	100.0	4,801	100.0	5,374	100.0	6,773	100.0
Field of employment:								
Biological scientists	1,356	39.6	2,142	44.6	1,933	36.0	2,772	40.9
Medical scientists	1,970	57.5	2,537	52.8	3,266	60.8	3,808	56.2
All other scientists	99	2.9	122	2.5	175	3.3	193	2.9
FTE graduate students	1,603	100.0	2,278	100.0	2,596	100.0	3,001	100.0
Function:								
Teaching	628	39.2	862	37.8	1,057	40.7	1,328	44.3
Research and development	884	55.1	1,358	59.6	1,336	51.5	1,528	50.9
Other activities	91	5.7	58	2.5	203	7.8	145	4.8

Table C-4. Number of technicians employed in medical schools, by field and function, January 1965, 1967, 1969, and 1971

Field of employment and function	January 1965		January 1967		January 1969		January 1971	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Number of technicians	16,153	100.0	19,800	100.0	20,138	100.0	21,350	100.0
Field of employment:								
Life science technicians	14,996	92.8	18,780	94.8	19,883	98.7	20,988	98.3
Biological sciences	n/a	.....	n/a	.....	n/a	.....	4,625	21.7
Medical and health-related sciences	n/a	.....	n/a	.....	n/a	.....	16,363	76.2
All other science technicians	1,157	7.2	1,020	5.2	255	1.3	362	1.7
Function:								
Research and development	11,465	71.0	14,736	74.4	14,283	70.9	15,324	71.8
Other activities	4,688	29.0	5,064	25.6	5,855	29.1	6,026	28.2

Note: Detail not available.

Table C-5. Current R&D expenditures in medical schools, 1964, 1966, 1968, and 1970

[Dollars in thousands]

Item	1964		1966		1968		1970	
	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
Current R&D expenditures	$440,057	100.0	$549,037	100.0	$703,043	100.0	$763,349	100.0
Character of work:								
Basic research	377,455	85.8	468,895	85.4	592,440	84.3	613,384	80.4
Applied research	57,435	13.0	73,171	13.3	102,060	14.5	125,677	16.5
Development	5,167	1.2	6,971	1.3	8,543	1.2	24,288	3.2
Field of science:								
Life sciences	434,375	99.9	538,723	99.4	689,032	99.2	732,121	99.1
Biological	96,108	22.1	130,724	24.1	177,957	25.6	181,087	24.5
Clinical medical	338,267	77.8	407,999	75.3	493,057	71.0	529,275	71.6
Other life sciences	.....	.....	.....	.....	18,018	2.6	21,759	2.9
All other sciences	515	.1	3,343	.6	5,468	.8	6,940	.9
Source of funds:								
Federal Government	284,039	64.5	369,172	67.2	474,210	67.4	502,783	65.9
Foundations and voluntary health agencies	29,536	6.7	34,191	6.2	42,573	6.1	50,009	6.6
Institutions' own funds	98,426	22.4	110,779	20.2	144,595	20.6	153,356	20.1
State and local governments	11,493	2.6	13,546	2.5	18,078	2.6	24,692	3.2
All other sources	16,563	3.8	21,349	3.9	23,587	3.4	32,509	4.2

APPENDIX C

Reproduction of Survey Form

NSF FORM 412, November 1970

OMB No. 99 R0263
Approval expires December 31, 1971

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC ACTIVITIES OF INSTITUTIONS OF HIGHER EDUCATION, 1971

Organizations are requested to complete and return this form to:

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

Organizational Unit:
(Please correct if name or address has changed)

(Aggregate data from 105 medical schools)

The blue questionnaire is to be used to report data for the organizational unit designated in the box at upper right. The questionnaire requests two types of information on the scientific activities of the designated organizational unit: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction. List below the names of any research institutes, laboratories, bureaus, hospitals, or foundations included in the organizational unit covered in this report:

_____

_____

_____

_____

_____

_____

Organizations are requested to complete and return this form to:

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

Organizational Unit:
(Please correct if name or address has changed)

(Aggregate data from 105 medical schools)

The blue questionnaire is to be used to report data for the organizational unit designated in the box at upper right. The questionnaire requests two types of information on the scientific activities of the designated organizational unit: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction. List below the names of any research institutes, laboratories, bureaus, hospitals, or foundations included in the organizational unit covered in this report:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please read the enclosed instructions before completing this form. Where exact data are not available, estimates are acceptable. Enter "O" as a total rather than leave an item blank.

The data requested in this questionnaire will be published as statistical totals or aggregates for all institutions or for selected groups of institutions. In certain instances, however, the National Science Foundation may wish to publish selected survey data with the institution identified. Please indicate below the number of any item that should not be published with institutional identification:

_____

PART I—PERSONNEL DATA

(Includes items 1 to 6 of the survey questionnaire)

Personnel data are to be reported as of January 1971 or as close as possible thereto.

SECTION A. NUMBER OF SCIENTISTS AND ENGINEERS

(NOTE: Figures on graduate students engaged part time as scientists and engineers should be reported in Section B).

Item 1. Full-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0110	74	7	56	11
(1) Aeronautical engineers	0111	-	-	-	-
(2) Chemical engineers	0112	6	1	5	-
(3) Civil engineers	0113	1	-	-	1
(4) Electrical engineers	0114	39	1	33	5
(5) Mechanical engineers	0115	2	-	1	1
(6) Other engineers	0116	26	5	17	4
b. Physical scientists (total)	0120	237	67	164	6
(1) Chemists	0121	172	48	123	1
(2) Earth scientists	0122	-	-	-	-
(3) Physicists	0123	54	8	41	5
(4) Other physical scientists	0124	11	11	-	-
c. Mathematicians (total)	0130	44	11	30	3
d. Life scientists (total)	0140	38,967	19,443	13,587	5,937
(1) Agricultural scientists	0141	1	-	-	1
(2) Biological scientists	0142	7,336	3,799	3,277	260
(3) Medical scientists	0143	31,630	15,644	10,310	5,676
e. Psychologists (total)	0150	294	144	102	48
f. Social scientists (total)	0160	215	86	54	75
(1) Economists	0161	2	2	-	-
(2) Sociologists	0162	111	53	26	32
(3) Political scientists	0163	-	-	-	-
(4) Historians	0164	5	4	1	-
(5) Other social scientists	0165	97	27	27	43
g. Total *(sum of a to f)*	0100	39,831	19,758	13,993	6,080
h. FTE distribution, by function[b]	0190	39,831	18,975	14,476	6,380

Item 2. Full-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971

	TOTAL[a]	PH.D. OR	M.D., D.D.S.,	MASTER'S	BACHELOR'S OR THE

a. Engineers (total)	0110	74	7	56	11
(1) Acronautical engineers	0111	-	-	-	-
(2) Chemical engineers	0112	6	1	5	-
(3) Civil engineers	0113	1	-	-	1
(4) Electrical engineers	0114	39	1	33	5
(5) Mechanical engineers	0115	2	-	1	1
(6) Other engineers	0116	26	5	17	4
b. Physical scientists (total)	0120	237	67	164	6
(1) Chemists	0121	172	48	123	1
(2) Earth scientists	0122	-	-	-	-
(3) Physicists	0123	54	8	41	5
(4) Other physical scientists	0124	11	11	-	-
c. Mathematicians (total)	0130	44	11	30	3
d. Life scientists (total)	0140	38,967	19,443	13,587	5,937
(1) Agricultural scientists	0141	1	-	-	1
(2) Biological scientists	0142	7,336	3,799	3,277	260
(3) Medical scientists	0143	31,630	15,644	10,310	5,67[illegible]
e. Psychologists (total)	0150	294	144	102	48
f. Social scientists (total)	0160	215	86	54	75
(1) Economists	0161	2	2	-	-
(2) Sociologists	0162	111	53	26	32
(3) Political scientists	0163	-	-	-	-
(4) Historians	0164	5	4	1	-
(5) Other social scientists	0165	97	27	27	43
g. Total *(sum of a to f)*	0100	39,831	19,758	13,993	6,080
h. FTE distribution, by function[b]	0190	39,831	18,975	14,476	6,380

Item 2. Full-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0210	74	12	-	32	30
b. Physical scientists	0220	237	123	26	29	59
c. Mathematicians	0230	44	24	-	12	8
d. Life scientists	0240	38,967	8,938	25,239	2,315	2,475
e. Psychologists	0250	294	181	62	37	14
f. Social scientists	0260	215	69	53	75	18
g. Total *(sum of a to f)*	0200	39,831	9,347	25,380	2,500	2,604

[a]Totals in items 1a to 1g, column 1, *should be the same* as the corresponding totals in items 2a to 2g, column 1.

[b]The total reported in item 1h, column 1, should, by definition, be the same as the total in item 1g, column 1. However, the FTE distribution by function (columns 2, 3, and 4) will not necessarily coincide with the functional distribution on a "primarily employed" basis in item 1g.

Item 3. Part-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971. (Exclude graduate students here but report them in Section B)

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0310	6	1	5	-
(1) Aeronautical engineers	0311	-	-	-	-
(2) Chemical engineers	0312	-	-	-	-
(3) Civil engineers	0313	-	-	-	-
(4) Electrical engineers	0314	2	-	2	-
(5) Mechanical engineers	0315	1	1	-	-
(6) Other engineers	0316	3	-	3	-
b. Physical scientists (total)	0320	22	14	7	1
(1) Chemists	0321	7	3	4	-
(2) Earth scientists	0322	-	-	-	-
(3) Physicists	0323	4	-	3	1
(4) Other physical scientists	0324	11	11	-	-
c. Mathematicians (total)	0330	1	-	1	-
d. Life scientists (total)	0340	16,062	9,848	4,726	1,488
(1) Agricultural scientists	0341	3	3	-	-
(2) Biological scientists	0342	1,225	723	464	38
(3) Medical scientists	0343	14,834	9,122	4,262	1,450
e. Psychologists (total)	0350	89	53	30	6
f. Social scientists (total)	0360	23	14	8	1
(1) Economists	0361	-	-	-	-
(2) Sociologists	0362	8	2	6	-
(3) Political scientists	0363	-	-	-	-
(4) Historians	0364	-	-	-	-
(5) Other social scientists	0365	15	12	2	1
g. Total *(sum of a to f)*	0300	16,203	9,930	4,777	1,496
h. FTE distribution, by function[b]	0390	5,657	3,256	1,859	542

Item 4. Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.

FIELD OF EMPLOYMENT	TOTAL[a]	PH.D. OR	M.D., D.D.S.,	MASTER'S	BACHELOR'S OR THE

(6) Other engineers	0316	3	-	3	-
b. Physical scientists (total)	0320	22	14	7	1
(1) Chemists	0321	7	3	4	-
(2) Earth scientists	0322	-	-	-	-
(3) Physicists	0323	4	-	3	1
(4) Other physical scientists	0324	11	11	-	-
c. Mathematicians (total)	0330	1	-	1	-
d. Life scientists (total)	0340	16,062	9,848	4,726	1,488
(1) Agricultural scientists	0341	3	3	-	-
(2) Biological scientists	0342	1,225	723	464	38
(3) Medical scientists	0343	14,834	9,122	4,262	1,450
e. Psychologists (total)	0350	89	53	30	6
f. Social scientists (total)	0360	23	14	8	1
(1) Economists	0361	-	-	-	-
(2) Sociologists	0362	8	2	6	-
(3) Political scientists	0363	-	-	-	-
(4) Historians	0364	-	-	-	-
(5) Other social scientists	0365	15	12	2	1
g. Total *(sum of a to f)*	0300	16,203	9,930	4,777	1,496
h. FTE distribution, by function[b]	0390	5,657	3,256	1,859	542

Item 4. **Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.**

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0410	6	-	-	4	2
b. Physical scientists	0420	22	7	-	6	9
c. Mathematicians	0430	1	-	-	1	-
d. Life scientists	0440	16,062	1,791	12,993	952	326
e. Psychologists	0450	89	41	30	13	5
f. Social scientists	0460	23	5	-	12	6
g. Total *(sum of a to f)*	0400	16,203	1,844	13,023	988	348

[a] Totals in items 3a to 3g, column 1, *should be the same* as the corresponding totals in items 4a to 4g, column 1.
[b] The totals in item 3h converting figures on part-time employment into FTE's will necessarily differ from head-count totals in item 3g.

SECTION B. NUMBER OF GRADUATE STUDENTS ENGAGED PART TIME AS SCIENTISTS AND ENGINEERS

Item 5. Graduate students receiving compensation for part-time services as scientists and engineers at your institution, by field and function in which primarily engaged; and total FTE's, by function, January 1971.

FIELD OF EMPLOYMENT		TOTAL (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0510	9	3	6	-
(1) Aeronautical engineers	0511	-	-	-	-
(2) Chemical engineers	0512	5	3	2	-
(3) Civil engineers	0513	-	-	-	-
(4) Electrical engineers	0514	-	-	-	-
(5) Mechanical engineers	0515	1	-	1	-
(6) Other engineers	0516	3	-	3	-
b. Physical scientists (total)	0520	83	52	20	11
(1) Chemists	0521	54	34	20	-
(2) Earth scientists	0522	-	-	-	-
(3) Physicists	0523	-	-	-	-
(4) Other physical scientists	0524	29	18	-	11
c. Mathematicians (total)	0530	2	-	2	-
d. Life scientists (total)	0540	6,580	2,934	3,380	266
(1) Agricultural scientists	0541	-	-	-	-
(2) Biological scientists	0542	2,772	948	1,765	59
(3) Medical scientists	0543	3,808	1,986	1,615	207
e. Psychologists (total)	0550	93	34	59	-
f. Social scientists (total)	0560	6	1	-	5
(1) Economists	0561	-	-	-	-
(2) Sociologists	0562	1	1	-	-
(3) Political scientists	0563	-	-	-	-
(4) Historians	0564	-	-	-	-
(5) Other social scientists	0565	5	-	-	5
g. Total *(sum of a to f)*	0500	6,773	3,024	3,467	282
h. FTE distribution, by function*	0590	3,001	1,328	1,528	145

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. Technicians, by field and function in which primarily employed, January 1971

					OTHER

(5) Mechanical engineers	0515	1	-	1	-
(6) Other engineers	0516	3	-	3	-
b. Physical scientists (total)	0520	83	52	20	11
(1) Chemists	0521	54	34	20	-
(2) Earth scientists	0522	-	-	-	-
(3) Physicists	0523	-	-	-	-
(4) Other physical scientists	0524	29	18	-	11
c. Mathematicians (total)	0530	2	-	2	-
d. Life scientists (total)	0540	6,580	2,934	3,380	266
(1) Agricultural scientists	0541	-	-	-	-
(2) Biological scientists	0542	2,772	948	1,765	59
(3) Medical scientists	0543	3,808	1,986	1,615	207
e. Psychologists (total)	0550	93	34	59	-
f. Social scientists (total)	0560	6	1	-	5
(1) Economists	0561	-	-	-	-
(2) Sociologists	0562	1	1	-	-
(3) Political scientists	0563	-	-	-	-
(4) Historians	0564	-	-	-	-
(5) Other social scientists	0565	5	-	-	5
g. Total *(sum of a to f)*	0500	6,773	3,024	3,467	282
h. FTE distribution, by function*	0590	3,001	1,328	1,528	145

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. **Technicians, by field and function in which primarily employed, January 1971**

FIELD OF EMPLOYMENT		TOTAL (1)	R & D (2)	OTHER ACTIVITIES (3)
a. Engineering technicians	0610	88	68	20
b. Physical science technicians	0620	119	84	35
c. Biological science technicians (include agricultural)	0630	4,625	3,455	1,170
d. Medical and health-related technicians	0640	16,363	11,631	4,732
e. Social science technicians	0650	155	86	69
f. Total *(sum of a to e)*	0600	21,350	15,324	6,026

PART II—FINANCIAL DATA

(Includes items 7 to 13 of the survey questionnaire)

FINANCIAL DATA REPORTED IN PART II ARE FOR THE FISCAL YEAR, WHICH BEGAN ON JULY 1, 1969 AND ENDED ON JUNE 30, 1970, OR YOUR INSTITUTION'S EQUIVALENT FISCAL YEAR. SPECIFY THE ENDING DATE IF DIFFERENT FROM ABOVE:

_____

ALL FINANCIAL DATA REQUESTED ON THIS FORM SHOULD BE REPORTED IN THOUSANDS OF DOLLARS; FOR EXAMPLE, AN EXPENDITURE OF $25,342 SHOULD BE ROUNDED TO THE NEAREST THOUSAND DOLLARS AND REPORTED IN THE APPROPRIATE COLUMNS AS $25.

_____

*The numbers within parentheses in items 7 through 10 include an estimate for departmental research and other R&D costs for which most universities and colleges do not maintain separate records. The numbers outside the parentheses represent separately-budgeted R&D expenditures as reported by institutions included in the survey. All charts and appendix tables include estimates for nonseparately budgeted R&D expenditures.

*In item 11 the numbers within parentheses represent both direct and

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ALL FINANCIAL DATA REQUESTED ON THIS FORM SHOULD BE REPORTED IN THOUSANDS OF DOLLARS; FOR EXAMPLE, AN EXPENDITURE OF $25,342 SHOULD BE ROUNDED TO THE NEAREST THOUSAND DOLLARS AND REPORTED IN THE APPROPRIATE COLUMNS AS $25.

*The numbers within parentheses in items 7 through 10 include an estimate for departmental research and other R&D costs for which most universities and colleges do not maintain separate records. The numbers outside the parentheses represent separately-budgeted R&D expenditures as reported by institutions included in the survey. All charts and appendix tables include estimates for nonseparately budgeted R&D expenditures.

*In item 11 the numbers within parentheses represent both direct and indirect costs for instruction. These numbers exclude estimates for departmental research but include indirect costs in item 12 associated with instruction. The numbers outside the parentheses represent total direct expenditures for instruction and departmental research as reported by survey respondents. All charts and appendix tables represent total instruction expenditures.

SECTION D

CURRENT EXPENDITURES FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT (R&D)

If your institution did not have any current expenditures for separately budgeted research and development in 1969-70 check "none" in the space provided here and skip to Section E. ☐ None.

(Exclude expenditures for capital equipment and facilities.)

Item 7. **Current expenditures for separately budgeted research and development, by source of funds, 1969-70**

SOURCE OF FUNDS		THOUSANDS OF DOLLARS		INTERNAL USE ONLY
a. Federal Government	0710	$ 502,783		equals 8d and 9d (Col. 2)
b. State government	0720	17,578		
c. Local government	0730	7,114		
d. Foundations	0740	25,620		
e. Voluntary health agencies	0750	24,389		
f. Industry	0760	13,618		
g. Institution's own funds	0770	23,167	(153,356)*	
h. Other sources	0780	18,891		
i. Total *(sum of a to h)*[a]	0700	$ 633,160	(763,349)*	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS			
		TOTAL (1)		FEDERAL GOVERNMENT (2)	
a. Direct wages and salaries	0810	$338,673	(416,780)*	$ 267,552	
b. All other direct costs (including materials and supplies)	0820	201,582	(214,604)*	156,309	
c. Indirect costs reimbursed or reimbursable	0830	92,905	(131,965)*	78,922	
d. Total *(sum of a to c)*[a]	0800	$ 633,160	(763,349)*	$ 502,783	

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

	THOUSANDS OF DOLLARS

		THOUSANDS OF DOLLARS		
c. Local government	0730	7,114		
d. Foundations	0740	25,620		
e. Voluntary health agencies	0750	24,389		
f. Industry	0760	13,618		
g. Institution's own funds	0770	23,167	(153,356)*	
h. Other sources	0780	18,891		
i. Total *(sum of a to h)*[a]	0700	$ 633,160	(763,349)*	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS		
		TOTAL (1)		FEDERAL GOVERNMENT (2)
a. Direct wages and salaries	0810	$338,673	(416,780)*	$ 267,552
b. All other direct costs (including materials and supplies)	0820	201,582	(214,604)*	156,309
c. Indirect costs reimbursed or reimbursable	0830	92,905	(131,965)*	78,922
d. Total *(sum of a to c)*[a]	0800	$ 633,160	(763,349)*	$ 502,783

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

TYPE OF R&D ACTIVITY		THOUSANDS OF DOLLARS		
		TOTAL (1)		FEDERAL GOVERNMENT (2)
a. Basic research	0910	$505,326	(613,384)*	$ 401,846
b. Applied research	0920	103,546	(125,677)*	80,922
c. Development	0930	24,288		20,015
d. Total *(sum of a to c)*[a]	0900	$633,160	(763,349)*	$ 502,783

[a]Totals in items 7i, 8d (Col. 1) and 9d (Col. 1) should be identical. Similarly, figures reported in items 7a, 8d (Col. 2) and 9d (Col. 2) should be identical. If figures for the foregoing items are not consistent, please give reasons in "Remarks" at the end of the questionnaire.

Item 10. **Total and federally financed current expenditures for separately budgeted basic and applied research, by field of science, 1969-70**

FIELD OF SCIENCE		THOUSANDS OF DOLLARS: TOTAL (1)	THOUSANDS OF DOLLARS: FEDERAL GOVERNMENT (2)
a. Engineering (total)	1010	$ 62	$ 60
b. Physical sciences (total)	1020	$ 2,185	$ 1,214
(1) Astronomy	1021	–	–
(2) Chemistry	1022	1,611	842
(3) Physics	1023	574	372
(4) Physical sciences, NEC	1024	–	–
c. Environmental sciences (total)	1030	$ 323	$ –
d. Mathematics (total)	1040	$ 746	$ 382
e. Life sciences (total)	1050	$ 601,932 (732,121)*	$ 478,462
(1) Biological	1051	148,925 (181,087)*	121,609
(2) Clinical medical	1052	435,154 (529,275)*	342,474
(3) Life sciences, NEC	1053	17,853 (21,759)*	14,379
f. Psychology (total)	1060	$ 979	$ 879
(1) Biological aspects	1061	125	121
(2) Social aspects	1062	290	204
(3) Psychological sciences, NEC	1063	564	554
g. Social sciences (total)	1070	$ 1,541	$ 844
(1) Economics	1071	79	68
(2) Political science	1072	262	33
(3) Sociology	1073	646	345
(4) Social sciences, NEC	1074	554	398
h. Other sciences, NEC (total)	1080	$ 1,104	$ 927
i. Total (*sum of a to h*)*	1000	$ 608,872 (739,061)*	$ 482,768

* If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E
CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. **Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70**

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)	INTERNAL USE ONLY
a. Engineering	1110	$	

(4) Physical sciences, NEC	1024	–	–
c. Environmental sciences (total)	1030	$ 323	$ –
d. Mathematics (total)	1040	$ 746	$ 382
e. Life sciences (total)	1050	$ 601,932 (732,121)*	$ 478,462
(1) Biological	1051	148,925 (181,087)*	121,609
(2) Clinical medical	1052	435,154 (529,275)*	342,474
(3) Life sciences, NEC	1053	17,853 (21,759)*	14,379
f. Psychology (total)	1060	$ 979	$ 879
(1) Biological aspects	1061	125	121
(2) Social aspects	1062	290	204
(3) Psychological sciences, NEC	1063	564	554
g. Social sciences (total)	1070	$ 1,541	$ 844
(1) Economics	1071	79	68
(2) Political science	1072	262	33
(3) Sociology	1073	646	345
(4) Social sciences, NEC	1074	554	398
h. Other sciences, NEC (total)	1080	$ 1,104	$ 927
i. Total (*sum of a to h*)*	1000	$ 608,872 (739,061)*	$ 482,768

* If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E

CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. **Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70**

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)		INTERNAL USE ONLY
a. Engineering	1110	$ –	–	
b. Physical and environmental sciences	1120	821	(1,212)*	
c. Mathematics	1130	78	(103)*	
d. Life sciences	1140	539,569	(573,507)*	
e. Psychology	1150	992	(1,326)*	
f. Social sciences	1160	165	(223)*	
g. Other sciences, NEC	1170	4,209	(5,037)*	
h. Total (*sum of a to g*)	1100	$ 545,834	(581,408)*	

Item 12. **Estimate the dollar amount of overhead or indirect costs allocable to the instruction and departmental research activities reported above (item 11)**

	THOUSANDS OF DOLLARS
1200	$ 165,763

SECTION F

CAPITAL EXPENDITURES FOR SCIENTIFIC AND ENGINEERING FACILITIES AND EQUIPMENT FOR RESEARCH, DEVELOPMENT, AND INSTRUCTION

Item 13. **Capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction, by field of science, source of funds, and purpose, 1969-70.**

Prorate any expenditures intended for use in two or more fields of science and for R&D and graduate and undergraduate instruction. Do not include any materials and supplies reported under current expenditures in Section D or Section E. Include current fund expenditures for equipment and facilities as well as plant and other funds.

	FIELD OF SCIENCE		SOURCE OF FUNDS (THOUSANDS OF DOLLARS)			
			TOTAL (1)	FEDERAL GOVERNMENT (2)	STATE AND LOCAL GOVERNMENT (3)	OTHER SOURCES (4)
13.1	**All purposes (total)**					
	a. Engineering	1310	$ -	$ -	-	-
	b. Physical and environmental sciences	1320	89	14	25	50
	c. Mathematics	1330	10	1	9	-
	d. Life sciences	1340	202,843	77,579	73,495	51,769
	e. Psychology	1350	10	10	-	-
	f. Social sciences	1360	-	-	-	-
	g. Other sciences, NEC	1370	4,370	1,972	1,774	624
	h. Total *(sum of a to g)*	1300	$ 207,322	$ 79,576	75,303	52,443
13.2	**Research and development and/or graduate instruction**					
	a. Engineering	1311	$ -	$ -	-	-
	b. Physical and environmental sciences	1321	72	14	11	47
	c. Mathematics	1331	10	1	9	-
	d. Life sciences	1341	182,074	73,016	65,385	43,673
	e. Psychology	1351	10	10	-	-
	f. Social sciences	1361	-	-	-	-
	g. Other sciences, NEC	1371	2,829	1,147	1,274	408
	h. Total *(sum of a to g)*	1301	$ 184,995	$ 74,188	66,679	44,128
13.3	**Undergraduate instruction**					
	a. Engineering	1312	$ -	$ -	-	-
	b. Physical and environmental sciences	1322	17	-	14	3
	c. Mathematics	1332	-	-	-	-
	d. Life sciences	1342	20,769	4,563	8,110	8,096
	e. Psychology	1352	-	-	-	-
	f. Social sciences	1362	-	-	-	-
	g. Other sciences, NEC	1372	1,541	825	500	216

13.1	All purposes (total)					
	a. Engineering	1310	$ -	$ -	-	-
	b. Physical and environmental sciences	1320	89	14	25	50
	Mathematics	1330	10	1	9	-
	d. Life sciences	1340	202,843	77,579	73,495	51,769
	e. Psychology	1350	10	10	-	-
	f. Social sciences	1360	-	-	-	-
	g. Other sciences, NEC	1370	4,370	1,972	1,774	624
	h. Total *(sum of a to g)*	1300	$ 207,322	$ 79,576	75,303	52,443
13.2	**Research and development and/or graduate instruction**					
	a. Engineering	1311	$ -	$ -	-	-
	b. Physical and environmental sciences	1321	72	14	11	47
	c. Mathematics	1331	10	1	9	-
	d. Life sciences	1341	182,074	73,016	65,385	43,673
	e. Psychology	1351	10	10	-	-
	f. Social sciences	1361	-	-	-	-
	g. Other sciences, NEC	1371	2,829	1,147	1,274	408
	h. Total *(sum of a to g)*	1301	$ 184,995	$ 74,188	66,679	44,128
13.3	**Undergraduate instruction**					
	a. Engineering	1312	$ -	$ -	-	-
	b. Physical and environmental sciences	1322	17	-	14	3
	c. Mathematics	1332	-	-	-	-
	d. Life sciences	1342	20,769	4,563	8,110	8,096
	e. Psychology	1352	-	-	-	-
	f. Social sciences	1362	-	-	-	-
	g. Other sciences, NEC	1372	1,541	825	500	216
	h. Total *(sum of a to g)*	1302	$ 22,327	$ 5,388	8,624	8,315

REMARKS: *If additional space is needed, attach an extra page.*

NAME OF PERSON SUBMITTING THIS FORM	TITLE
NAME OF INSTITUTION	ADDRESS *(number, street, city, state, ZIP code)*
AREA CODE, TELEPHONE NO., EXT. / DATE	

Appendix D

Statistical Tables

University-Administered Federally Funded Research and Development Centers (Part II)

D-1. Selected employment characteristics of scientific activities in university-administered FFRDC's, January 1971 75

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D-4. Selected financial characteristics of scientific activities in university-administered FFRDC's, 1970. . . . 76

List of Federally Funded Research and D
Administered by Universities and Unive

DEPARTMENT OF DEFENSE

Department of the Army

Army Mathematics Center (University of Wisconsin).
Center for Research in Social Systems (American University).

Department of the Navy

Applied Physics Laboratory (Johns Hopkins University).
Applied Physics Laboratory (University of Washington).
Center for Naval Analyses (University of Rochester).
Ordnance Research Laboratory (Pennsylvania State University).

Department of the Air Force

Lincoln Laboratory (Massachusetts Institute of Technology).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

Center for the Advanced Study of Educational Administration (University of Oregon).
Center for Research and Development in Higher Education (University of California).
Center for Research and Development for Learning and Reeducation (University of Wisconsin).
Center for the Study of the Evaluation of Instructional Programs (University of California).
Center for the Study of Social Organization of Schools and the Learning Process (Johns Hopkins University).
Coordination Center for the National Program in Early Childhood Education (University of Illinois).
Learning Research and Development Center (University of Pittsburgh).
Research and Development Center in Educational Stimulation (University of Georgia).
Research and Development Center in Teacher Education (University of Texas).
Stanford Center for Research and Development in Teaching (Stanford University).

[1] All of the organizations listed here were designated by the Federal Council for Science and Technology to be FFRDC's in academic year 1969-70.

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List of Federally Funded Research and Development Centers Administered by Universities and University Consortia[1]

DEPARTMENT OF DEFENSE

Department of the Army

Army Mathematics Center (University of Wisconsin).
Center for Research in Social Systems (American University).

Department of the Navy

Applied Physics Laboratory (Johns Hopkins University).
Applied Physics Laboratory (University of Washington).
Center for Naval Analyses (University of Rochester).
Ordnance Research Laboratory (Pennsylvania State University).

Department of the Air Force

Lincoln Laboratory (Massachusetts Institute of Technology).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

Center for the Advanced Study of Educational Administration (University of Oregon).
Center for Research and Development in Higher Education (University of California).
Center for Research and Development for Learning and Reeducation (University of Wisconsin).
Center for the Study of the Evaluation of Instructional Programs (University of California).
Center for the Study of Social Organization of Schools and the Learning Process (Johns Hopkins University).
Coordination Center for the National Program in Early Childhood Education (University of Illinois).
Learning Research and Development Center (University of Pittsburgh).
Research and Development Center in Educational Stimulation (University of Georgia).
Research and Development Center in Teacher Education (University of Texas).
Stanford Center for Research and Development in Teaching (Stanford University).

ATOMIC ENERGY COMMISSION

Ames Laboratory (Iowa State University of Science and Technology).
Argonne National Laboratory (University of Chicago and Argonne Universities Association).
Brookhaven National Laboratory (Associated Universities, Inc.).
Cambridge Electron Accelerator (Harvard University and Massachusetts Institute of Technology).
Lawrence Radiation Laboratory, Berkeley and Livermore (University of California).
Los Alamos Scientific Laboratory (University of California).
National Accelerator Laboratory (Universities Research Association).
Oak Ridge Associated Universities.
Plasma Physics Laboratory (Princeton University).
Princeton-Pennsylvania Accelerator (Princeton University and University of Pennsylvania).
Stanford Linear Accelerator Center (Stanford University).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Jet Propulsion Laboratory (California Institute of Technology).
Space Radiation Effects Laboratory (College of William and Mary).

NATIONAL SCIENCE FOUNDATION

Arecibo Observatory (Cornell University).
Cerro Tololo Inter-American Observatory (Association of Universities for Research in Astronomy, Inc.).
Kitt Peak National Observatory (Association of Universities for Research in Astronomy, Inc.).
National Center for Atmospheric Research (University Corporation for Atmospheric Research).
National Radio Astronomy Observatory (Associated Universities, Inc.).

[1] All of the organizations listed here were designated by the Federal Council for Science and Technology to be FFRDC's in academic year 1969-70.

The institutions comprising the membership of the managing consortia are as follows:

Associated Universities, Inc.

Columbia University
Cornell University
Harvard University
Johns Hopkins University
Massachusetts Institute of Technology
University of Pennsylvania
Princeton University
University of Rochester
Yale University

Association of Universities for Research in Astronomy, Inc

University of California
University of Chicago
Harvard University
Indiana University
University of Michigan
Ohio State University
Princeton University
University of Texas
University of Wisconsin
Yale University

University Corporation for Atmospheric Research

University of Alaska
University of Arizona
University of California
Catholic University of America
University of Chicago
Colorado State University
University of Colorado
Cornell University
University of Denver
Florida State University
University of Hawaii
Johns Hopkins University
University of Maryland
Massachusetts Institute of Technology
University of Miami
University of Michigan
University of Minnesota
University of Missouri
New York University
University of Oklahoma
Pennsylvania State University
St. Louis University
Texas A&M University
University of Texas
University of Utah
University of Washington
University of Wisconsin

Oak Ridge Associated Universities

University of Alabama
University of Arkansas
Auburn University
Catholic University of America
Clemson University
Duke University
Emory University
Fisk University
University of Florida
Florida State University
University of Georgia
Georgia Institute of Technology
University of Kentucky
Louisiana State University
University of Louisville
University of Maryland
Medical College of Virginia
Meharry Medical College
University of Miami
University of Mississippi
Mississippi State University
University of North Carolina
North Carolina State University
North Texas State University
University of Oklahoma
University of Puerto Rico
Rice University
University of South Carolina
Southern Methodist University
University of Tennessee
University of Texas
Texas A&M University
Texas Christian University
Texas Women's University
Tulane University
Tuskegee Institute
Vanderbilt University
University of Virginia
Virginia Polytechnic Institute
West Virginia University
College of William and Mary

University Research Association

University of Arizona
Brown University
California Institute of Technology
University of California - Berkeley
University of California - Los Angeles
University of California - San Diego
Carnegie Mellon University
Case Western Reserve University
University of Chicago
University of Colorado
Columbia University

Cornell Ur
Duke Uni
Florida St
Harvard U
University
Indiana U
Iowa Stat
University
Johns Ho
University
Massachu
Michigan
University
University
University
Northwes
University
Ohio Stat
University
Princeton
Purdue U
Rice Univ
Universit
Rockefell
Rutgers.
Stanford
State Un
State Un
Stevens I
Syracuse
Universit
Universit
Tulane U
Vanderbi
Universit
Washingt
Universit
Universit
Yale Uni

Argonne Univer

Carnegie
Case We
Illinois I
Indiana
Iowa Sta
Kansas S
Loyola U
Marquet
Michigan
Northwe
Ohio Sta
Purdue U
St. Louis

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Istronomy, Inc.

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Oak Ridge Associated Universities

University of Alabama
University of Arkansas
Auburn University
Catholic University of America
Clemson University
Duke University
Emory University
Fisk University
University of Florida
Florida State University
University of Georgia
Georgia Institute of Technology
University of Kentucky
Louisiana State University
University of Louisville
University of Maryland
Medical College of Virginia
Meharry Medical College
University of Miami
University of Mississippi
Mississippi State University
University of North Carolina
North Carolina State University
North Texas State University
University of Oklahoma
University of Puerto Rico
Rice University
University of South Carolina
Southern Methodist University
University of Tennessee
University of Texas
Texas A&M University
Texas Christian University
Texas Women's University
Tulane University
Tuskegee Institute
Vanderbilt University
University of Virginia
Virginia Polytechnic Institute
West Virginia University
College of William and Mary

University Research Association

University of Arizona
Brown University
California Institute of Technology
University of California - Berkeley
University of California - Los Angeles
University of California - San Diego
Carnegie Mellon University
Case Western Reserve University
University of Chicago
University of Colorado
Columbia University
Cornell University
Duke University
Florida State University
Harvard University
University of Illinois
Indiana University
Iowa State University
University of Iowa
Johns Hopkins University
University of Maryland
Massachusetts Institute of Technology
Michigan State University
University of Michigan
University of Minnesota
University of North Carolina - Chapel Hill
Northwestern University
University of Notre Dame
Ohio State University
University of Pennsylvania
Princeton University
Purdue University
Rice University
University of Rochester
Rockefeller University
Rutgers, the State University
Stanford University
State University of New York - Buffalo
State University of New York - Stony Brook
Stevens Institute of Technology
Syracuse University
University of Texas
University of Toronto
Tulane University
Vanderbilt University
University of Virginia
Washington University - St. Louis
University of Washington
University of Wisconsin
Yale University

Argonne Universities Association

Carnegie Mellon University
Case Western Reserve University
Illinois Institute of Technology
Indiana University
Iowa State University
Kansas State University
Loyola University
Marquette University
Michigan State University
Northwestern University
Ohio State University
Purdue University
St. Louis University

University of Arizona
University of Chicago
University of Cincinnati
University of Illinois
University of Iowa
University of Kansas
University of Michigan
University of Minnesota
University of Missouri
University of Notre Dame
University of Wisconsin
Washington University - St. Louis
Wayne State University

Table D-1. Scientists and engineers employed in university-administered F sponsoring Federal agency, field of employment, and function, Janua

Sponsoring Federal agency	Scientists ar			
		Field of employme		
	Total number	Engineers	Physical scientists	Mathemat
Total	11,339	5,127	4,321	1,090
Sponsoring Federal agency:				
Atomic Energy Commission	6,891	2,540	3,402	562
Department of Defense	2,140	1,375	400	274
National Aeronautics and Space Administration	1,696	1,102	332	196
National Science Foundation	345	109	187	49
Department of Health, Education, and Welfare	267	1	--	9

[a]Federally Funded Research and Development Centers.

[b]Includes psychologists, social, and life scientists

Table D-2. Number of scientists and engineers employed in univers Funded Research and Development Centers, by field of employment,

Field of employment	Fede Research and	
	1965	1967
Total	11,017	10,732
Engineers	4,969	4,779
Aeronautical	204	184
Chemical	263	288
Civil	180	175
Electrical	2,194	2,092
Mechanical	1,311	1,331
Other engineers	817	709
Physical scientists	4,247	4,343
Chemists	1,254	1,307
Earth scientists	152	147
Physicists	2,357	2,569
Other physical scientists	484	320
Mathematicians	952	975
Life scientists	653	450
Agricultural	37	------
Biological	436	336
Medical	180	114
Psychologists	109	106
Social scientists	87	79
Economists	4	4
Sociologists	13	7
Political scientists	13	20
Historians	(NA)	(NA)
Other social scientists	57	48

Table D-1. Scientists and engineers employed in university-administered FFRDC's,[a] by sponsoring Federal agency, field of employment, and function, January 1971

Sponsoring Federal agency	Scientists and engineers						
		Field of employment					
	Total number	Engineers	Physical scientists	Mathematicians	Other scientists[b]	Full-time equivalents	Total number in research and development
Total	11,339	5,127	4,321	1,090	801	11,166	11,151
Sponsoring Federal agency:							
Atomic Energy Commission	6,891	2,540	3,402	562	387	6,771	6,760
Department of Defense	2,140	1,375	400	274	91	2,137	2,112
National Aeronautics and Space Administration	1,696	1,102	332	196	66	1,694	1,696
National Science Foundation	345	109	187	49	--	342	323
Department of Health, Education, and Welfare	267	1	--	9	257	222	260

[a]Federally Funded Research and Development Centers.

[b]Includes psychologists, social, and life scientists

Table D-2. Number of scientists and engineers employed in university-administered Federally Funded Research and Development Centers, by field of employment, 1965, 1967, 1969, and 1971

Field of employment	Federally Funded Research and Development Centers			
	January			
	1965	1967	1969	1971
Total	11,017	10,732	11,502	11,339
Engineers	4,969	4,779	5,050	5,127
Aeronautical	204	184	183	172
Chemical	263	288	293	244
Civil	180	175	142	149
Electrical	2,194	2,092	2,185	2,239
Mechanical	1,311	1,331	1,459	1,336
Other engineers	817	709	788	987
Physical scientists	4,247	4,343	4,415	4,322
Chemists	1,254	1,307	1,270	1,203
Earth scientists	152	147	85	23
Physicists	2,357	2,569	2,673	2,612
Other physical scientists	484	320	387	484
Mathematicians	952	975	1,091	1,090
Life scientists	653	450	424	383
Agricultural	37	.....	.....	.....
Biological	436	336	333	306
Medical	180	114	91	77
Psychologists	109	106	173	94
Social scientists	87	79	349	323
Economists	4	4	45	41
Sociologists	13	7	33	34
Political scientists	13	20	17	13
Historians	(NA)	(NA)	12	10
Other social scientists	57	48	242	225

Table D-3. Current R&D expenditures in university-administered FFRDC's, by character of work, 1953-70[a]

[Dollars in millions]

Year	Total	Basic research		Applied research		Development	
		Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
1953[b]	$121	$ 33	27.3	$ 44	36.4	$ 44	36.4
1954	141	39	27.7	51	36.2	51	36.2
1955[b]	180	49	27.2	65	36.1	66	36.7
1956[b]	194	51	26.3	71	36.6	72	37.1
1957[b]	240	65	27.1	86	35.8	89	37.1
1958	293	78	26.6	102	34.8	113	38.6
1959[b]	338	92	27.2	119	35.2	127	37.6
1960[b]	360	97	26.9	122	33.9	141	39.2
1961[b]	410	115	28.0	135	32.9	160	39.0
1962[b]	470	136	28.9	155	33.0	179	38.1
1963[b]	530	159	30.0	170	32.1	201	37.9
1964	629	191	30.4	202	32.1	236	37.5
1965[b]	629	208	33.1	204	32.4	217	34.5
1966	630	227	36.0	207	32.9	196	31.1
1967[b]	673	250	37.1	219	32.5	204	30.3
1968	719	276	38.4	231	32.1	212	29.5
1969[b]	725	275	37.9	210	29.0	240	33.1
1970	737	269	36.5	216	29.3	252	34.2

[a]See appendix D for the list of university-administered Federally Funded Research and Development Centers surveyed in 1970

[b]Estimates derived from related information; no survey took place this year.

Table D-4. Selected financial characteristics of scientific activities in university-administered FFRDC's,[a] 1970

[Dollars in thousands]

Federal agency and geographic division	Number of FFRDC's	Research and development expenditures				
		Current expenditures				Capital[c] expenditures
		Total[b]	Basic research	Applied research	Development	
Total	35	$736,847	$268,732	$215,587	$252,528	$163,328
Sponsoring Federal agency:						
Atomic Energy Commission	11	465,440	195,711	159,106	110,623	138,923
Department of Defense	7	131,450	7,329	30,353	93,768	2,597
National Aeronautics and Space Administration	2	104,238	34,350	23,398	46,490	13,782
National Science Foundation	5	26,048	26,048	.....	.....	7,808
Department of Health, Education, and Welfare	10	9,671	5,294	2,730	1,647	218
Geographic region:						
Northeast	7	140,796	57,133	29,143	54,520	24,546
North Central	6	101,971	48,750	14,152	39,069	57,145
South	10	67,412	11,384	17,315	38,713	3,220
West	12	426,668	151,465	154,977	120,226	78,417

[a]Federally Funded Research and Development Centers.

[b]Includes $2.7 million in non-Federal funds.

[c]Includes $1.1 million in non-Federal funds.

APPENDIX D

Reproduction of Survey Form

NSF FORM 412, November 1970

OMB No. 99-R0263
Approval expires December 31, 1971

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC ACTIVITIES OF INSTITUTIONS OF HIGHER EDUCATION, 1971

Organizations are requested to complete and return this form to:

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

Organizational Unit:
(Please correct if name or address has changed)

(Aggregate data from 35 university-administered FFRDC's)

The blue questionnaire is to be used to report data for the organizational unit designated in the box at upper right. The questionnaire requests two types of information on the scientific activities of the designated organizational unit: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction. List below the names of any research institutes, laboratories, bureaus, hospitals, or foundations included in the organizational unit covered in this report:

_____

_____

_____

_____

_____

_____

Organizations are requested to complete and return this form to:

National Science Foundation
Washington, D.C. 20550
Attn: UNISG

Organizational Unit:
(Please correct if name or address has changed)

(Aggregate data from 35 university-administered FFRDC's)

The blue questionnaire is to be used to report data for the organizational unit designated in the box at upper right. The questionnaire requests two types of information on the scientific activities of the designated organizational unit: Part I, employment of professional and technical personnel, and Part II, current and capital expenditures for research, development, and instruction. List below the names of any research institutes, laboratories, bureaus, hospitals, or foundations included in the organizational unit covered in this report:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please read the enclosed instructions before completing this form. Where exact data are not available, estimates are acceptable. Enter "O " as a total rather than leave an item blank.

The data requested in this questionnaire will be published as statistical totals or aggregates for all institutions or for selected groups of institutions. In certain instances, however, the National Science Foundation may wish to publish selected survey data with the institution identified. Please indicate below the number of any item that should not be published with institutional identification:

_____

PART I—PERSONNEL DATA

(Includes items 1 to 6 of the survey questionnaire)

Personnel data are to be reported as of January 1971 or as close as possible thereto.

SECTION A. NUMBER OF SCIENTISTS AND ENGINEERS

(NOTE: Figures on graduate students engaged part time as scientists and engineers should be reported in Section B).

Item 1. **Full-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971**

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0110	5,093	-	5,001	92
(1) Aeronautical engineers	0111	172	-	171	1
(2) Chemical engineers	0112	242	-	235	7
(3) Civil engineers	0113	149	-	145	4
(4) Electrical engineers	0114	2,226	-	2,201	25
(5) Mechanical engineers	0115	1,325	-	1,308	17
(6) Other engineers	0116	979	-	941	38
b. Physical scientists (total)	0120	4,181	-	4,107	74
(1) Chemists	0121	1,163	-	1,135	28
(2) Earth scientists	0122	22	-	22	-
(3) Physicists	0123	2,524	-	2,501	23
(4) Other physical scientists	0124	472	-	449	23
c. Mathematicians (total)	0130	1,059	-	1,052	7
d. Life scientists (total)	0140	359	-	352	7
(1) Agricultural scientists	0141	-	-	-	-
(2) Biological scientists	0142	287	-	280	7
(3) Medical scientists	0143	72	-	72	-
e. Psychologists (total)	0150	57	-	55	2
f. Social scientists (total)	0160	269	-	268	1
(1) Economists	0161	39	-	39	-
(2) Sociologists	0162	24	-	23	1
(3) Political scientists	0163	13	-	13	-
(4) Historians	0164	9	-	9	-
(5) Other social scientists	0165	184	-	184	-
g. Total *(sum of a to f)*	0100	11,018	-	10,835	183
h. FTE distribution, by function[b]	0190	11,018	-	10,831	187

Item 2. **Full-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971**

	TOTAL[a]	PH.D. OR	M.D., D.D.S.,	MASTER'S	BACHELOR'S OR THE

(1) Aeronautical engineers	0111	172	-	171	1
(2) Chemical engineers	0112	242	-	235	7
(3) Civil engineers	0113	149	-	145	4
(4) Electrical engineers	0114	2,226	-	2,201	25
(5) Mechanical engineers	0115	1,325	-	1,308	17
(6) Other engineers	0116	979	-	941	38
b. Physical scientists (total)	0120	4,181	-	4,107	74
(1) Chemists	0121	1,163	-	1,135	28
(2) Earth scientists	0122	22	-	22	-
(3) Physicists	0123	2,524	-	2,501	23
(4) Other physical scientists	0124	472	-	449	23
c. Mathematicians (total)	0130	1,059	-	1,052	7
d. Life scientists (total)	0140	359	-	352	7
(1) Agricultural scientists	0141	-	-	-	-
(2) Biological scientists	0142	287	-	280	7
(3) Medical scientists	0143	72	-	72	-
e. Psychologists (total)	0150	57	-	55	2
f. Social scientists (total)	0160	269	-	268	1
(1) Economists	0161	39	-	39	-
(2) Sociologists	0162	24	-	23	1
(3) Political scientists	0163	13	-	13	-
(4) Historians	0164	9	-	9	-
(5) Other social scientists	0165	184	-	184	-
g. Total *(sum of a to f)*	0100	11,018	-	10,835	183
h. FTE distribution, by function[b]	0190	11,018	-	10,831	187

Item 2. Full-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0210	5,093	603	-	1,602	2,892
b. Physical scientists	0220	4,181	2,569	1	671	940
c. Mathematicians	0230	1,059	139	1	341	578
d. Life scientists	0240	359	160	43	62	94
e. Psychologists	0250	57	35	-	10	12
f. Social scientists	0260	269	76	2	114	77
g. Total *(sum of a to f)*	0200	11,018	3,582	47	2,800	4,593

[a]Totals in items 1a to 1g, column 1, *should be the same* as the corresponding totals in items 2a to 2g, column 1.

[b]The total reported in item 1h, column 1, should, by definition, be the same as the total in item 1g, column 1. However, the FTE distribution by function (columns 2, 3, and 4) will not necessarily coincide with the functional distribution on a "primarily employed" basis in item 1g.

Item 3. Part-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971. (Exclude graduate students here but report them in Section B)

FIELD OF EMPLOYMENT		TOTAL[a] (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0310	34	-	33	1
(1) Aeronautical engineers	0311	-	-	-	-
(2) Chemical engineers	0312	2	-	2	-
(3) Civil engineers	0313	-	-	-	-
(4) Electrical engineers	0314	13	-	13	-
(5) Mechanical engineers	0315	11	-	11	-
(6) Other engineers	0316	8	-	7	1
b. Physical scientists (total)	0320	141	-	141	-
(1) Chemists	0321	40	-	40	-
(2) Earth scientists	0322	1	-	1	-
(3) Physicists	0323	88	-	88	-
(4) Other physical scientists	0324	12	-	12	-
c. Mathematicians (total)	0330	31	-	31	-
d. Life scientists (total)	0340	24	-	24	-
(1) Agricultural scientists	0341	-	-	-	-
(2) Biological scientists	0342	19	-	19	-
(3) Medical scientists	0343	5	-	5	-
e. Psychologists (total)	0350	37	-	36	1
f. Social scientists (total)	0360	54	-	51	3
(1) Economists	0361	2	-	2	-
(2) Sociologists	0362	10	-	9	1
(3) Political scientists	0363	-	-	-	-
(4) Historians	0364	1	-	1	-
(5) Other social scientists	0365	41	-	39	2
g. Total *(sum of a to f)*	0300	321	-	316	5
h. FTE distribution, by function[b]	0390	148	-	144	4

Item 4. Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.

FIELD OF EMPLOYMENT	TOTAL[a]	PH.D. OR	M.D., D.D.S.,	MASTER'S	BACHELOR'S OR THE

(5) Mechanical engineers	0315	11	-	11	-
(6) Other engineers	0316	8	-	7	1
b. Physical scientists (total)	0320	141	-	141	-
(1) Chemists	0321	40	-	40	-
(2) Earth scientists	0322	1	-	1	-
(3) Physicists	0323	88	-	88	-
(4) Other physical scientists	0324	12	-	12	-
c. Mathematicians (total)	0330	31	-	31	-
d. Life scientists (total)	0340	24	-	24	-
(1) Agricultural scientists	0341	-	-	-	-
(2) Biological scientists	0342	19	-	19	-
(3) Medical scientists	0343	5	-	5	-
e. Psychologists (total)	0350	37	-	36	1
f. Social scientists (total)	0360	54	-	51	3
(1) Economists	0361	2	-	2	-
(2) Sociologists	0362	10	-	9	1
(3) Political scientists	0363	-	-	-	-
(4) Historians	0364	1	-	1	-
(5) Other social scientists	0365	41	-	39	2
g. Total *(sum of a to f)*	0300	321	-	316	5
h. FTE distribution, by function[b]	0390	148	-	144	4

Item 4. Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.

FIELD OF EMPLOYMENT		TOTAL[a] (1)	PH.D. OR SC.D. (2)	M.D., D.D.S., ETC. (3)	MASTER'S (4)	BACHELOR'S OR THE EQUIVALENT (5)
a. Engineers	0410	34	4	-	17	13
b. Physical scientists	0420	141	92	-	13	35
c. Mathematicians	0430	31	7	-	8	16
d. Life scientists	0440	24	11	5	4	5
e. Psychologists	0450	37	27	-	9	1
f. Social scientists	0460	54	25	1	15	13
g. Total *(sum of a to f)*	0400	321	166	6	66	83

[a] Totals in items 3a to 3g, column 1, *should be the same* as the corresponding totals in items 4a to 4g, column 1.
[b] The totals in item 3h converting figures on part-time employment into FTE's will necessarily differ from head-count totals in item 3g.

SECTION B. NUMBER OF GRADUATE STUDENTS ENGAGED PART TIME AS SCIENTISTS AND ENGINEERS

Item 5. Graduate students receiving compensation for part-time services as scientists and engineers at your institution, by field and function in which primarily engaged; and total FTE's, by function, January 1971.

FIELD OF EMPLOYMENT		TOTAL (1)	TEACHING (2)	R & D (3)	OTHER ACTIVITIES (4)
a. Engineers (total)	0510	87	-	85	2
(1) Aeronautical engineers	0511	6	-	5	1
(2) Chemical engineers	0512	12	-	12	-
(3) Civil engineers	0513	-	-	-	-
(4) Electrical engineers	0514	20	-	20	-
(5) Mechanical engineers	0515	3	-	3	-
(6) Other engineers	0516	46	-	45	1
b. Physical scientists (total)	0520	496	-	494	2
(1) Chemists	0521	183	-	182	1
(2) Earth scientists	0522	3	-	3	-
(3) Physicists	0523	197	-	197	-
(4) Other physical scientists	0524	113	-	112	1
c. Mathematicians (total)	0530	36	-	36	-
d. Life scientists (total)	0540	31	-	31	-
(1) Agricultural scientists	0541	-	-	-	-
(2) Biological scientists	0542	31	-	31	-
(3) Medical scientists	0543	-	-	-	-
e. Psychologists (total)	0550	44	-	44	-
f. Social scientists (total)	0560	128	-	128	-
(1) Economists	0561	5	-	5	-
(2) Sociologists	0562	4	-	4	-
(3) Political scientists	0563	4	-	4	-
(4) Historians	0564	-	-	-	-
(5) Other social scientists	0565	115	-	115	-
g. Total *(sum of a to f)*	0500	822	-	818	4
h. FTE distribution, by function*	0590	460	-	458	2

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. Technicians, by field and function in which primarily employed, January 1971

OTHER

(6) Other engineers	0516	46	-	45	1
b. Physical scientists (total)	0520	496	-	494	2
(1) Chemists	0521	183	-	182	1
(2) Earth scientists	0522	3	-	3	-
(3) Physicists	0523	197	-	197	-
(4) Other physical scientists	0524	113	-	112	1
c. Mathematicians (total)	0530	36	-	36	-
d. Life scientists (total)	0540	31	-	31	-
(1) Agricultural scientists	0541	-	-	-	-
(2) Biological scientists	0542	31	-	31	-
(3) Medical scientists	0543	-	-	-	-
e. Psychologists (total)	0550	44	-	44	-
f. Social scientists (total)	0560	128	-	128	-
(1) Economists	0561	5	-	5	-
(2) Sociologists	0562	4	-	4	-
(3) Political scientists	0563	4	-	4	-
(4) Historians	0564	-	-	-	-
(5) Other social scientists	0565	115	-	115	-
g. Total *(sum of a to f)*	0500	822	-	818	4
h. FTE distribution, by function*	0590	460	-	458	2

*The totals in item 5h converting figures on part-time services into FTE's will necessarily differ from head-count totals in item 5g.

SECTION C. NUMBER OF TECHNICIANS EMPLOYED IN THE SCIENCES AND ENGINEERING

Item 6. Technicians, by field and function in which primarily employed, January 1971

FIELD OF EMPLOYMENT		TOTAL (1)	R & D (2)	OTHER ACTIVITIES (3)
a. Engineering technicians	0610	6,232	5,836	396
b. Physical science technicians	0620	1,417	1,332	85
c. Biological science technicians (include agricultural)	0630	273	272	1
d. Medical and health-related technicians	0640	280	280	-
e. Social science technicians	0650	36	36	-
f. Total *(sum of a to e)*	0600	8,238	7,756	482

PART II—FINANCIAL DATA

(Includes items 7 to 13 of the survey questionnaire)

FINANCIAL DATA REPORTED IN PART II ARE FOR THE FISCAL YEAR, WHICH BEGAN ON JULY 1, 1969 AND ENDED ON JUNE 30, 1970, OR YOUR INSTITUTION'S EQUIVALENT FISCAL YEAR. SPECIFY THE ENDING DATE IF DIFFERENT FROM ABOVE:

_____

ALL FINANCIAL DATA REQUESTED ON THIS FORM SHOULD BE REPORTED IN THOUSANDS OF DOLLARS; FOR EXAMPLE, AN EXPENDITURE OF $25,342 SHOULD BE ROUNDED TO THE NEAREST THOUSAND DOLLARS AND REPORTED IN THE APPROPRIATE COLUMNS AS $25.

SECTION D

CURRENT EXPENDITURES FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT (R&D)

If your institution did not have any current expenditures for separately budgeted research and development in 1969-70 check "none" in the space provided here and skip to Section E. ☐ None.

(Exclude expenditures for capital equipment and facilities.)

Item 7. **Current expenditures for separately budgeted research and development, by source of funds, 1969-70**

SOURCE OF FUNDS		THOUSANDS OF DOLLARS	INTERNAL USE ONLY
a. Federal Government	0710	$ 734,131	equals 8d and 9d (Col. 2)
b. State government	0720	310	
c. Local government	0730	-	
d. Foundations	0740	281	
e. Voluntary health agencies	0750	1	
f. Industry	0760	121	
g. Institution's own funds	0770	1,706	
h. Other sources	0780	297	
i. Total *(sum of a to h)*[a]	0700	$ 736,847	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Direct wages and salaries	0810	$ 350,640	$ 349,443
b. All other direct costs (including materials and supplies)	0820	269,332	268,829
c. Indirect costs reimbursed or reimbursable	0830	116,875	115,859
d. Total *(sum of a to c)*[a]	0800	$ 736,847	$ 734,131

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

a. Federal Government	0710	$ 734,131	equals 8d and 9d (Col. 2)
b. State government	0720	310	
c. Local government	0730	-	
d. Foundations	0740	281	
e. Voluntary health agencies	0750	1	
f. Industry	0760	121	
g. Institution's own funds	0770	1,706	
h. Other sources	0780	297	
i. Total *(sum of a to h)*[a]	0700	$ 736,847	equals 8d and 9d (Col. 1)

Item 8. **Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.**

COST ITEM		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Direct wages and salaries	0810	$ 350,640	$ 349,443
b. All other direct costs (including materials and supplies)	0820	269,332	268,829
c. Indirect costs reimbursed or reimbursable	0830	116,875	115,859
d. Total *(sum of a to c)*[a]	0800	$ 736,847	$ 734,131

Item 9. **Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.**

TYPE OF R&D ACTIVITY		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Basic research	0910	$ 268,732	$ 267,084
b. Applied research	0920	215,587	214,925
c. Development	0930	252,528	252,122
d. Total *(sum of a to c)*[a]	0900	$ 736,847	$ 734,131

[a]Totals in items 7i, 8d (Col. 1) and 9d (Col. 1) should be identical. Similarly, figures reported in items 7a, 8d (Col. 2) and 9d (Col. 2) should be identical. If figures for the foregoing items are not consistent, please give reasons in "Remarks" at the end of the questionnaire.

Item 10. Total and federally financed current expenditures for separately budgeted basic and applied research, by field of science, 1969-70

FIELD OF SCIENCE		THOUSANDS OF DOLLARS	
		TOTAL (1)	FEDERAL GOVERNMENT (2)
a. Engineering (total)	1010	$ 65,852	$ 65,702
b. Physical sciences (total)	1020	$ 337,607	$ 337,443
(1) Astronomy	1021	15,584	15,584
(2) Chemistry	1022	56,162	56,157
(3) Physics	1023	250,373	250,214
(4) Physical sciences, NEC	1024	15,488	15,488
c. Environmental sciences (total)	1030	$ 18,131	$ 18,099
d. Mathematics (total)	1040	$ 15,763	$ 15,140
e. Life sciences (total)	1050	$ 27,459	$ 27,304
(1) Biological	1051	21,536	21,526
(2) Clinical medical	1052	5,426	5,281
(3) Life sciences, NEC	1053	497	497
f. Psychology (total)	1060	$ 976	$ 956
(1) Biological aspects	1061	-	-
(2) Social aspects	1062	375	355
(3) Psychological sciences, NEC	1063	601	601
g. Social sciences (total)	1070	$ 5,059	$ 4,258
(1) Economics	1071	20	20
(2) Political science	1072	220	201
(3) Sociology	1073	102	91
(4) Social sciences, NEC	1074	4,717	3,946
h. Other sciences, NEC (total)	1080	$ 13,472	$ 13,107
i. Total (*sum of a to h*)*	1000	$ 484,319	$ 482,009

* If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E

CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)	INTERNAL USE ONLY
a. Engineering	1110	$ -	
b. Physical and environmental sciences	1120	-	
c. Mathematics	1130		

c. Environmental sciences (total)	1030	$ 18,131	$ 18,099
d. Mathematics (total)	1040	$ 15,763	$ 15,140
e. Life sciences (total)	1050	$ 27,459	$ 27,304
(1) Biological	1051	21,536	21,526
(2) Clinical medical	1052	5,426	5,281
(3) Life sciences, NEC	1053	497	497
f. Psychology (total)	1060	$ 976	$ 956
(1) Biological aspects	1061	-	-
(2) Social aspects	1062	375	355
(3) Psychological sciences, NEC	1063	601	601
g. Social sciences (total)	1070	$ 5,059	$ 4,258
(1) Economics	1071	20	20
(2) Political science	1072	220	201
(3) Sociology	1073	102	91
(4) Social sciences, NEC	1074	4,717	3,946
h. Other sciences, NEC (total)	1030	$ 13,472	$ 13,107
i. Total (*sum of a to h*)*	1000	$ 484,319	$ 482,009

* If your institution has development funds please do *not* distribute them by field of science. Totals in 10i (columns 1 and 2) should be identical with the sum of lines 9a and 9b (columns 1 and 2).

SECTION E

CURRENT EXPENDITURES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH IN THE SCIENCES AND ENGINEERING

Item 11. Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70

FIELD OF SCIENCE		TOTAL INSTRUCTION AND DEPARTMENTAL RESEARCH (THOUSANDS OF DOLLARS)	INTERNAL USE ONLY
a. Engineering	1110	$ -	
b. Physical and environmental sciences	1120	-	
c. Mathematics	1130	-	
d. Life sciences	1140	-	
e. Psychology	1150	-	
f. Social sciences	1160	-	
g. Other sciences, NEC	1170	-	
h. Total (*sum of a to g*)	1100	$ -	

Item 12. Estimate the dollar amount of overhead or indirect costs allocable to the instruction and departmental research activities reported above (item 11)

1200 — THOUSANDS OF DOLLARS $

SECTION F
CAPITAL EXPENDITURES FOR SCIENTIFIC AND ENGINEERING FACILITIES AND EQUIPMENT FOR RESEARCH, DEVELOPMENT, AND INSTRUCTION

Item 13. **Capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction, by field of science, source of funds, and purpose, 1969-70.**

Prorate any expenditures intended for use in two or more fields of science and for R&D and graduate and undergraduate instruction. Do not include any materials and supplies reported under current expenditures in Section D or Section E. Include current fund expenditures for equipment and facilities as well as plant and other funds.

	FIELD OF SCIENCE		SOURCE OF FUNDS (THOUSANDS OF DOLLARS)			
			TOTAL (1)	FEDERAL GOVERNMENT (2)	STATE AND LOCAL GOVERNMENT (3)	OTHER SOURCES (4)
13.1	**All purposes (total)**					
	a. Engineering	1310	$ 19,624	$ 19,593	-	31
	b. Physical and environmental sciences	1320	137,297	136,235	-	1,062
	c. Mathematics	1330	3,401	3,375	-	26
	d. Life sciences	1340	2,785	2,785	-	-
	e. Psychology	1350	20	15	-	5
	f. Social sciences	1360	17	14	-	3
	g. Other sciences, NEC	1370	184	175	-	9
	h. Total *(sum of a to g)*	1300	$ 163,328	$ 162,192	-	1,136
13.2	**Research and development and/or graduate instruction**					
	a. Engineering	1311	$ 19,624	$ 19,593	-	31
	b. Physical and environmental sciences	1321	137,297	136,235	-	1,062
	c. Mathematics	1331	3,401	3,375	-	26
	d. Life sciences	1341	2,785	2,785	-	-
	e. Psychology	1351	20	15	-	5
	f. Social sciences	1361	17	14	-	3
	g. Other sciences, NEC	1371	184	175	-	9
	h. Total *(sum of a to g)*	1301	$ 163,328	$ 162,192	-	1,136
13.3	**Undergraduate instruction**					
	a. Engineering	1312	$ -	$ -	-	-
	b. Physical and environmental sciences	1322	-	-	-	-
	c. Mathematics	1332	-	-	-	-
	d. Life sciences	1342	-	-	-	-
	e. Psychology	1352	-	-	-	-
	f. Social sciences	1362	-	-	-	-
	g. Other sciences, NEC	1372	-	-	-	-
	h. Total *(sum of a to g)*	1302	$ -	$ -	-	-

REMARKS: *If additional space is needed, attach an extra page.*

	c. Mathematics	1330	3,401	3,375	-	26
	d. Life sciences	1340	2,785	2,785	-	-
	e. Psychology	1350	20	15	-	5
	f. Social sciences	1360	17	14	-	3
	g. Other sciences, NEC	1370	184	175	-	9
	h. Total *(sum of a to g)*	1300	$ 163,328	$ 162,192	-	1,136
13.2	**Research and development and/or graduate instruction**					
	a. Engineering	1311	$ 19,624	$ 19,593	-	31
	b. Physical and environmental sciences	1321	137,297	136,235	-	1,062
	c. Mathematics	1331	3,401	3,375	-	26
	d. Life sciences	1341	2,785	2,785	-	-
	e. Psychology	1351	20	15	-	5
	f. Social sciences	1361	17	14	-	3
	g. Other sciences, NEC	1371	184	175	-	9
	h. Total *(sum of a to g)*	1301	$ 163,328	$ 162,192	-	1,136
13.3	**Undergraduate instruction**					
	a. Engineering	1312	$ -	$ -	-	-
	b. Physical and environmental sciences	1322	-	-	-	-
	c. Mathematics	1332	-	-	-	-
	d. Life sciences	1342	-	-	-	-
	e. Psychology	1352	-	-	-	-
	f. Social sciences	1362	-	-	-	-
	g. Other sciences, NEC	1372	-	-	-	-
	h. Total *(sum of a to g)*	1302	$ -	$ -	-	-

REMARKS: *If additional space is needed, attach an extra page.*

NAME OF PERSON SUBMITTING THIS FORM	TITLE
NAME OF INSTITUTION	ADDRESS *(number, street, city, state, ZIP code)*
AREA CODE, TELEPHONE NO., EXT. / DATE	

Appendix E

Reproduction of Covering Letter and Instructions[1]

[1] The questionnaires used in the survey are reproduced in appendixes B, C, and D. NSF Form 411 in appendix C was used to obtain data for the university or college as a whole, while NSF Form 412 was used to obtain separate data for medical schools and university-administered FFRDC's, respectively.

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

November 25, 1970

Dear Sir:

The National Science Foundation requests your assistance in its Survey of Scientific Activities of Institutions of Higher Education, 1971. The enclosed questionnaire seeks information on the employment of scientific and engineering personnel in January 1971 and the financing of scientific and engineering activities at your institution during academic year 1969-70. Please return the completed questionnaire in the enclosed self-addressed envelope in January 1971, or as soon thereafter as possible.

As you may know, this survey of universities and colleges is conducted biennially as an integral part of NSF's program of periodic surveys and studies designed to gather factual information on the allocation of scientific and engineering resources in industry, the Federal Government, universities and colleges, and other nonprofit institutions. The results of such studies are used by the National Science Foundation and other public and private organizations in the formulation of policies and programs to strengthen science and technology throughout the national economy.

Enclosed also is a self-addressed postcard requesting the name and title of the official assigned to complete the questionnaire for your institution. Your prompt return of this postcard to the National Science Foundation will insure that any inquiries regarding your institution's participation in the survey will be directed to the appropriate official. If any questions arise regarding the interpretation of the survey questionnaire, please write or call Dr. Joseph H. Schuster (Area Code 202, 632-4080) at the Foundation's Office of Economic and Manpower Studies.

The Foundation is grateful for your past cooperation and will appreciate your participation in this survey.

Sincerely yours,

Charles E. Falk
Director, Division of Science
Resources and Policy Studies

Enclosures

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

INSTRUCTIONS FOR SURVEY OF SCIENTIFIC ACTIVITIES OF INSTITUTIONS OF HIGHER EDUCATION, 1971

OUTLINE OF INSTRUCTIONS

GENERAL

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Reporting Units 2

PART I. PERSONNEL DATA

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GENERAL

The National Science Foundation requests your cooperation in completing the attached questionnaire covering the personnel and financial characteristics of your institution as they relate to the sciences and engineering.

The purpose of this survey is to obtain statistical data on the resources devoted to scientific activities at institutions of higher education. This information will assist the National Science Foundation to fulfill its responsibilities in supporting basic research and education in the sciences and in the formulation of recommendations on national science policy in keeping with the National Science Foundation Acts of 1950 and 1968.

Each institution included in this survey is requested to supply data on the number of scientific and technical personnel engaged in scientific and engineering activities; the total current expenditures for separately budgeted (i.e., organized) research and development (R&D); current expenditures for instruction and departmental research in the sciences and engineering; and capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction. Because information on some items may not be available from records normally maintained by your institution, reasonable estimates for such items will be satisfactory. Enter "0" as a total, rather than leave an item blank.

This survey is generally comparable to that conducted by this office in 1969, covering expenditures for the academic year 1967-68 and manpower as of mid-January 1969. Where data reported in this survey differ significantly from those reported in the previous survey, please attach a short note in the space provided for "remarks" indicating the reasons for the difference, such as "opening of new medical school," etc.

If you have any questions regarding information requested on this form, write to Universities and Nonprofit Institutions Studies Group, National Science Foundation, Washington, D.C., 20550. Additional forms may be obtained by writing to the above address.

PERIOD COVERED BY THE REPORT

Personnel data (Part I) are to be reported as of mid-January 1971, or as close thereto as possible.

The time period covered in the financial sections of the form (Part II) is the fiscal year which began on July 1, 1969, and ended on June 30, 1970, or your institution's equivalent fiscal year ending in 1970.

REPORTING UNITS

This survey covers research, development, and other scientific activities of all branches and other units of the parent institution, both on and off the main campus, in the United States and its outlying areas.

Every institution should complete a white form (NSF Form 411) presenting aggregate data for the entire institution, exclusive of university-administered Federally Funded Research and Development Centers (FFRDC's). Institutions administering FFRDC's should exclude FFRDC data from Form 411. Medical school data, however, should be *included* on Form 411. If data are requested for one or more units of an institution, blue forms (NSF Form 412) will be attached with the names of the units concerned entered on them. The blue form should be completed for only that part of the institution which is specified on the form. If your institution has not received forms for all such units, as described in the instructions below, additional forms will be supplied upon request.

For purposes of this survey, the various organizational units of colleges and universities for which a blue questionnaire (NSF Form 412) is requested are defined as follows:

Federally Funded Research and Development Centers, as designated by Federal agencies, are R&D organizations exclusively or substantially financed by the Government, and administered on a contractual basis by educational institutions or other organizations.

Medical Schools are those two- or four-year schools of medicine approved by the Council on Medical Education and Hospitals and the Association of American Medical Colleges. Included are hospitals or clinics owned, operated, or controlled by universities and integrated operationally with the clinical programs of their medical schools. Also included are research bureaus or institutes which are integral parts of medical schools. In addition, include those research bureaus and institutes which are nonuniversity owned but are affiliated with the medical school and any university bureaus and institutes which may be outside the departmental structure of universities but whose senior research staff members hold teaching appointments with medical schools.

Alternative Reporting Procedure—Although NSF Form 411 is intended to be used to report data for the institute as a whole, it is recognized that some institutions may find it convenient to submit separate reports for branches or other organizational units. If your institution prefers to submit separate reports for branches or other organizational units rather than a single report covering the entire institution, list in the space provided on the first page of NSF Form 411 all branches or other organizational units of your institution which have been excluded from NSF Form 411 and for which separate reports are being submitted. This procedure may be used in the case of separate organizational units for which separate data have been provided on NSF Form 412.

NOTE: Separate data on the scientific activities of agricultural experiment stations, agricultural extension services and affiliated colleges of agriculture *are not requested* in this survey. However, data for these organizational units should be included in the report for the institution as a whole.

PART I—PERSONNEL DATA

(Includes items 1 to 6 of the survey questionnaire)

The survey requests data on the number of professional and technical personnel employed or engaged in science and engineering activities in all branches and other organizational units of your institution, whether on or off the main campus, in the United States or in its outlying areas. Include all such personnel who were paid a salary or stipend and members of religious orders who received no remuneration while employed at the institution. Exclude personnel on sabbatical or other leave status and personnel employed in branches of your institution located in foreign countries. Also exclude voluntary workers, such as voluntary staff members at medical and dental schools.

Report data for scientific and technical personnel employed as of mid-January 1971, or as close to that date as possible.

Categories of scientific and engineering personnel for whom the survey requests separate data are as follows: Full-time and part-time scientists and engineers (Section A), graduate students engaged part time as scientists and engineers (Section B), and technicians employed in the sciences and engineering (Section C). Additional information regarding procedures to be used in reporting personnel data is included in instructions relating to individual Sections or items.

The following instructions relate to the reporting of scientists and engineers by those institutions with separate administrative units (FFRDC's and medical schools) for which NSF Form 412 (blue questionnaire) will be prepared.

A. For *Federally Funded Research and Development Centers* include data for scientists and engineers holding appointments at the center. Personnel holding joint appointments in more than one organizational unit including a center are to be reported for the center only if they held their principal appointments with the center.

B. For *medical schools* include as scientists only those physicians, dentists, public health specialists, pharmacists, etc., who spend the greatest proportion of their time in teaching, clinical investigation, or other R&D activities. Exclude all medical practitioners who spend the greatest proportion of their time providing patient care, dispensing drugs or services, or in diagnosis, etc. Exclude unpaid voluntary staff. Include scientists employed by hospitals or clinics owned, operated, or controlled by the university and integrated operationally with the clinical programs of the medical school. Include residents employed in such hospitals or clinics, but *exclude interns*. Student health services are not to be included in the form for the medical school.

Classification of Fields of Employment

Listed below are the broad and detailed fields of employment with additional explanation of coverage, which are to be used in classifying scientists and engineers included in Part 1, items 1 through 6. Please classify persons employed in interdisciplinary or multidisciplinary specializations in the listed fields with which their activities (teaching, research, or other) are most closely identified. For example, a scientist employed in general categories such as science education should be classified into the discipline most closely related to the academic requirements of his position, such as mathematics, sociology, or psychology.

Engineers:
- Aeronautical
- Chemical (includes ceramic)
- Civil (includes architectural, structural, sanitary)
- Electrical (includes electronic)
- Mechanical
- Other (includes agricultural, industrial, mining and metallurgical, nuclear, textile)

Physical scientists:
- Chemists
- Earth scientists (includes geologists, geophysicists, meteorologists, oceanographers, physical geographers)
- Physicists
- Other physical scientists (includes astronomers, metallurgists)

Mathematicians: (includes statisticians and computer scientists)

Life scientists:

Agricultural scientists (includes agronomists, foresters, husbandrymen, horticulturists, soil scientists)
Biological scientists (includes anatomists, bacteriologists, botanists, geneticists, microbiologists, pathologists, pharmacologists, physiologists, zoologists)
Medical scientists (includes all branches of medical, dental, veterinary medicine and other clinical fields)

Psychologists: (includes clinical, social, educational, industrial and personnel, counseling and guidance, and experimental psychologists)

Social scientists:

Economists (includes agricultural economists, econometricians)
Sociologists
Political scientists
Historians
Other social scientists (includes anthropologists, archeologists, demographers, social and economic geographers)

Section A—Number of Scientists and Engineers

(Exclusive of graduate students)

(Note: Figures on graduate students engaged part time as scientists and engineers should be reported in Section B)

This section requests data on full-time and part-time scientists and engineers employed or engaged in teaching, research and development, or other activities. The reporting institution is requested to use its own definition of what constitutes a full-time appointment.

Scientists and engineers include salaried personnel of your institution who have received a bachelor's degree or higher or, if foreign educated, academic training equal to a bachelor's degree or higher, and who are working at a professional level (a level at which the knowledge acquired by such academic training is essential in the performance of duties) in the sciences or engineering.

Item 1. Full-time scientists and engineers, by field and function in which *primarily* employed, and total full-time equivalents, by function, January 1971.

In items 1a to 1g, the functional classification of professional personnel into teaching (column 2); R&D (column 3) and other activities (column 4), should be based on the function in which the person is primarily engaged or employed at the institution. For example, a person engaged in two or all three of the specified functional categories should be classified in the function in which he spends the largest proportion of his time. In classifying personnel by function, take into account only activities carried out under the auspices or the official encouragement of your institution. Exclude outside consulting work and teaching not performed under the auspices of your institution.

In classifying an individual under a particular category (teaching, research and development, or other activities), take into consideration all official activities even if carried on in a school or department other than the one in which he holds his principal appointment.

Teaching (column 2) is defined as encompassing those activities connected with degree credit courses or which are intended to lead ultimately to the granting of degrees or certificates or to professional certification or licensing. Included are such functions as instruction and training performed in connection with degree credit courses and the administration of such instruction and training. Also include instruction of interns, residents, and other professional personnel receiving advanced training such as postdoctoral fellows or trainees.

Time spent by faculty or other staff members in supervising the thesis work of graduate students is considered to be part of the teaching function.

Research and development include basic and applied research in the sciences and in engineering, and design and development of prototypes and processes (column 3). Included in this function is the preparation for publication of books and papers describing the results of the specific research and development, if carried out as an integral part of that research and development. Also included is the administration of research and development.

Under *other activities* (column 4) report all professional personnel not primarily employed in teaching or research and development, as defined above. Examples of such activities are agri-

cultural demonstration work; adult education (if not degree credit); dissemination of scientific information: and student health services. Include as scientists only those physicians, dentists, public health specialists, pharmacists, etc., who spend the greatest proportion of their time in teaching, clinical investigation, or other R&D activities. Exclude all medical practitioners who spend the greatest proportion of their time providing patient care, dispensing drugs or services, or in diagnosis, etc.

In item 1h, classify personnel reported in item 1g in each of the three functions on a full-time-equivalent basis. Apportion time of staff members among the three functions on the basis of the proportion of effort or time spent in each of the functions. For example, 24 individuals devoting three-fourths time to teaching and one-fourth to research and development should be reported as 18 in teaching and 6 in research and development. *Calculate full-time equivalents to the nearest whole number.* In item 1h, figures in columns 2, 3, and 4 should add to the total in column 1.

Item 2. Full-time scientists and engineers, by field in which *primarily* employed and highest earned degree, January 1971.

Report scientists and engineers in the field in which they are primarily employed by the institution. Personnel engaged in administration or community service should be classified in the field most closely related to their present employment at the institution.

For the purposes of this survey, earned degrees are classified in four categories as defined below:

a. Ph.D. or Sc.D. degrees include all such earned degrees. Individuals holding *both* the Ph.D. (or Sc.D.) degree and a first-professional degree, such as the M.D., should be included in column 2.

b. Include individuals whose highest earned degrees are first-professional medical degrees that indicate the completion of the academic requirements based on programs that require at least two academic years of previous college work for entrance and require a total of at least six academic years of college work for completion. Specifically, include in column 3 first-professional degrees in Medicine (M.D.), Dentistry (D.D.S. or D.M.D.), Veterinary Medicine (D.V.M.), Chiropody or Podiatry (D.S.C. or D.P.), Optometry (O.D.), and Osteopathy (D.O.). Individuals holding *both* the Ph.D. (or Sc.D.) degree and a first-professional degree, such as the M.D., should be included in column 2 as mentioned in (a) above.

c. Master's degrees include all second-level degrees above the bachelor's degree and below the Ph.D. or Sc.D. and M.D., D.D.S., and other first-professional degrees (column 4).

d. Report all individuals whose highest earned degree is the bachelor's degree or a four- or five-year first-professional degree, or who have the equivalent in experience, even if they have not earned such a degree (column 5).

Item 3. Part-time scientists and engineers, by field and function in which primarily employed; and total full-time equivalents, by function, January 1971.

Instructions for item 1 relating to classification by field and function also relate to part-time professional staff in item 3.

In estimating the full-time equivalents of part-time personnel in item 3h, use your institution's definition of such equivalents. Thus, four part-time instructors, each of whom teaches one 3-hour credit course, may be reported as one full-time equivalent in teaching, if four such credit courses were considered the load of a full-time instructor at your institution. *Calculate full-time equivalents to the nearest whole number.*

Item 4. Part-time scientists and engineers, by field in which primarily employed and highest earned degree, January 1971.

The reporting institution is requested to use its own definition of what constitutes part-time employment. Instructions for item 2 relating to classification by field and highest earned degree also relate to part-time professional staff in item 4.

Section B—Number of Graduate Students Engaged Part Time as Scientists and Engineers

Item 5. Graduate students receiving compensation for part-time services as scientists and engineers at your institution, by field and function in which primarily engaged; and total full-time equivalents, by function, January 1971.

Include all graduate students who devote part of their time to a course of study designed to lead to an advanced degree in the sciences or engineering and who also receive compensation from your institution for part-time professional services performed in the sciences or engineering. This category includes (a) graduate students receiving salaries or wages for their services as teaching or research assistants and (b) graduate students receiving duty stipends, such as scholarships, fellowships, or traineeships, that require the performance of professional services in the sciences or engineering at your institution. Exclude graduate students receiving nonduty stipends and others who may be engaged in scientific and engineering activities on a voluntary basis.

Instructions in item 1 regarding classification by field and function may be used in classifying graduate students reported in item 5.

Section C—Number of Technicians Employed in the Sciences and Engineering

Item 6. Technicians, by field and function in which primarily employed, January 1971.

Technicians include all persons employed in positions which involve technical work at a level requiring knowledge of engineering, mathematics, physical science, life science, psychology, or social science comparable to that acquired through formal post high school training (less than a bachelor's degree), such as that obtained at technical institutes and junior colleges or through equivalent on-the-job training or experience. All personnel performing the duties described above should be reported as technicians even if they hold a bachelor's or higher degree. Some typical job titles include laboratory technician or assistant, physical science aide, engineering aide, statistical aide, draftsman, and computer programmer.

Do not include graduate students who were reported in item 5. Also exclude craftsmen such as electricians, carpenters, machinists, etc. In the case where undergraduate students, juniors or seniors, are employed in R&D activities, they may, where applicable, be included as technicians.

PART II—FINANCIAL DATA

(Includes items 7 to 13 of the survey questionnaire)

Section D—Current Expenditures for Separately Budgeted Research and Development (R&D)

(Expenditures for capital equipment and facilities are to be excluded here but reported in Section F.)

In general, financial data requested in this survey are intended to be consistent with principles of financial accounting for institutions of higher education presented in *College and University Business Administration* (Washington, D.C.; American Council on Education, 1968). Similarly, data in this survey are related to financial data reported in U.S. Office of Education's Higher Education General Information Survey, "Financial Statistics of Institutions of Higher Education." It should be noted, however, that there are a few terminological and other differences between the present survey and the Office of Education survey cited above. For example, the present survey uses the term, "Research and Development," to denote the entire spectrum of separately budgeted R&D activities, as defined above, whereas the Office of Education survey uses the term, "Organized Research."

All financial data requested on this form should be reported in thousands of dollars; for example, an expenditure of $25,342 should be rounded to the nearest thousand dollars and reported in the appropriate columns as $25.

DEFINITION OF RESEARCH AND DEVELOPMENT (R&D)

Research and development include basic and applied research in the sciences and in engineering, and design and development of prototypes and processes.

Research is a systematic, intensive, study directed toward fuller knowledge of the subject studied. Research may be either basic or applied.

Basic research is directed toward an increase of knowledge; it is research where the primary aim of the investigator is a fuller knowledge or understanding of the subject under study rather than a practical application thereof.

Applied research is directed toward the practical application of knowledge. The definition of applied research differs from the definition of basic research chiefly in terms of the objectives of the investigator.

Development is the systematic use of knowledge directed toward the design and production of useful prototypes, materials, devices, systems, methods, or processes. It does not include quality control or routine product testing.

Classification of Fields of Science

Listed below are illustrative disciplines included in engineering and the various fields of science for which separate data are requested in items 10, 11, and 13 of Part II of the questionnaire. *Classification of Fields of Employment* which is to be used in classifying scientists and engineers included in Part I, items 1 through 6 is shown on pages 3 and 4.

ENGINEERING

AERONAUTICAL:	Aerodynamics
ASTRONAUTICAL:	Aerospace, space technology
CHEMICAL:	Petroleum, petroleum refining, process
CIVIL:	Architectural, hydraulic, hydrologic, marine, sanitary and environmental, structural, transportation
ELECTRICAL:	Communication, electronic, power
MECHANICAL:	Engineering mechanics
METALLURGY AND MATERIALS:	Ceramic, mining, textile, welding
ENGINEERING, NEC:	Agricultural, industrial and management, nuclear, ocean engineering, systems

PHYSICAL SCIENCES

ASTRONOMY:	Laboratory astrophysics, optical astronomy, radio astronomy, theoretical astrophysics, x-ray, gamma-ray, neutrino astronomy
CHEMISTRY:	Inorganic, organo-metallic, organic, physical

PHYSICS:	Acoustics, atomic and molecular, condensed matter, elementary particles, nuclear structure, optics, plasma
ENVIRONMENTAL SCIENCES (Terrestrial and Extra-terrestrial)	
ATMOSPHERIC SCIENCES:	Aeronomy, solar, weather modification, extra-terrestrial atmospheres, meteorology
GEOLOGICAL SCIENCES:	Engineering geophysics, general geology, geodesy and gravity, geomagnetism, hydrology, inorganic geochemistry, isotopic geochemistry, organic geochemistry, lab geophysics, paleomagnetism, paleontology, physical geography and cartography, seismology, soil sciences
OCEANOGRAPHY:	Chemical oceanography, geological oceanography, physical oceanography, marine geophysics
MATHEMATICS	Algebra, analysis, applied mathematics, computer science, foundations and logic, geometry, numerical analysis, statistics, topology
LIFE SCIENCES	
BIOLOGICAL:	Anatomy, animal sciences, bacteriology, biochemistry, biogeography, biological oceanography, biophysics, ecology, embryology, entomology, evolutionary biology, genetics, immunology, microbiology, nutrition and metabolism, parasitology, pathology, pharmacology, physical anthropology, physiology, plant sciences, radiobiology, systematics
CLINICAL MEDICAL:	Internal medicine, neurology, ophthalmology, preventive medicine and public health, psychiatry, radiology, surgery, veterinary medicine, dentistry, physical medicine and rehabilitation, pharmacy, podiatry
PSYCHOLOGY	
BIOLOGICAL ASPECTS:	Experimental psychology, animal behavior, clinical psychology, comparative psychology, ethology
SOCIAL ASPECTS:	Social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality
SOCIAL SCIENCES	
ECONOMICS:	Econometrics and economic statistics; history of economic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development
POLITICAL SCIENCE:	Area or regional studies, comparative government, history of political ideas, international relations and law, national, political and legal systems; political theory, public administration
SOCIOLOGY:	Comparative and historical, complex organizations, culture and social structure, demography, group interactions, social problems and social welfare, sociological theory
SOCIAL SCIENCES, NEC:	Anthropology, history, linguistics, socio-economic geography, and research in education
OTHER SCIENCES, NEC	To be used only when multidisciplinary and interdisciplinary aspects make it impossible to classify the project or employment under one primary field.

Item 7. Current expenditures for separately budgeted research and development, by source of funds, 1969-70.

Source of funds refers to immediate sources rather than ultimate sources of funds concerned. For example, funds received by your institution from a foundation should be reported under that source, even if industry was the original source of some or all of the foundation's funds.

Under *Federal Government* (item 7a) include grants and contracts earmarked for research and development by all agencies of the Federal Government. In reporting Federal funds *institution to be performed by other organizations.*

Under *State government* (item 7b) include funds designated for R&D by the State government and its agencies.

Under *Local government* (item 7c) include funds designated for R&D by county, municipal, or other local governments and their agencies.

Under *Foundations* (item 7d) include grants and contracts earmarked for R&D by nonprofit philanthropic foundations and trusts not affiliated with your institution, such as the Carnegie, Ford, Kresge, or Rockefeller Foundations.

	raphy, biophysics, ecology, embryology, entomology, evolutionary biology, genetics, immunology, microbiology, nutrition and metabolism, parasitology, pathology, pharmacology, physical anthropology, physiology, plant sciences, radiobiology, systematics
CLINICAL MEDICAL:	Internal medicine, neurology, ophthalmology, preventive medicine and public health, psychiatry, radiology, surgery, veterinary medicine, dentistry, physical medicine and rehabilitation, pharmacy, podiatry
PSYCHOLOGY	
BIOLOGICAL ASPECTS:	Experimental psychology, animal behavior, clinical psychology, comparative psychology, ethology
SOCIAL ASPECTS:	Social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality
SOCIAL SCIENCES	
ECONOMICS:	Econometrics and economic statistics; history of economic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development
POLITICAL SCIENCE:	Area or regional studies, comparative government, history of political ideas, international relations and law, national, political and legal systems; political theory, public administration
SOCIOLOGY:	Comparative and historical, complex organizations, culture and social structure, demography, group interactions, social problems and social welfare, sociological theory
SOCIAL SCIENCES, NEC:	Anthropology, history, linguistics, socio-economic geography, and research in education
OTHER SCIENCES, NEC	To be used only when multidisciplinary and interdisciplinary aspects make it impossible to classify the project or employment under one primary field.

Item 7. Current expenditures for separately budgeted research and development, by source of funds, 1969-70.

Source of funds refers to immediate sources rather than ultimate sources of funds concerned. For example, funds received by your institution from a foundation should be reported under that source, even if industry was the original source of some or all of the foundation's funds.

Under *Federal Government* (item 7a) include grants and contracts earmarked for research and development by all agencies of the Federal Government. In reporting Federal funds for research and development, include those Federal funds channeled through State agencies. *Exclude R&D contracts subcontracted by your institution to be performed by other organizations.*

Under *State government* (item 7b) include funds designated for R&D by the State government and its agencies.

Under *Local government* (item 7c) include funds designated for R&D by county, municipal, or other local governments and their agencies.

Under *Foundations* (item 7d) include grants and contracts earmarked for R&D by nonprofit philanthropic foundations and trusts not affiliated with your institution, such as the Carnegie, Ford, Kresge, or Rockefeller Foundations. Funds from foundations which are affiliated with, or grant solely to, your institution, should be included under *Institution's own funds.*

Under *Voluntary health agencies* (item 7e) include grants and contracts specified for R&D by voluntary health agencies, such as the American Cancer Society and the American Heart Association. Funds specifically designated for R&D and derived from a health agency that is a unit of a State or local government should be reported under *State* or *local government*. Funds from professional societies such as the American Medical Association and the American Dental Association should be reported under *Other sources*.

Under *Industry* (including trade associations) (item 7f) include all grants and contracts allocated to R&D by profitmaking organizations, whether engaged in production, distribution, research, service, or other activities. Do not include grants and contracts from nonprofit foundations financed by industry, which should be reported under *Foundations*.

Under *Institution's own funds* (item 7g) include any funds which the institution was free to designate for R&D and which were in fact so budgeted. The sources of these funds may include endowment income; tuition and fees; general-purpose State or local government appropriations; and general-purpose grants from industry, foundations, health agencies or other outside sources, provided these were unrestricted funds and were utilized by your institution for separately budgeted R&D. Also include in item 7g all costs incurred in the performance of separately budgeted R&D projects carried out under Federal or non-Federal sponsorship that were defrayed by your institution out of its own funds, including costs defrayed in accordance with cost-sharing arrangements.

Under *Other sources* (item 7h) report any additional funds received from outside sources other than those already noted, and which were earmarked for R&D *by the source*. Examples include gifts, grants, or contracts received from private individuals or professional societies, and designated for R&D by them.

Item 8. Total and federally financed current expenditures for separately budgeted research and development, by major cost item, 1969-70.

The purpose of this question is to obtain a cost breakdown of the current expenditures associated with the performance of research and development at your institution. For each of the cost items for which separate data are requested, indicate the amount funded by the Federal Government (column 2). The total shown in 8d (column 1) should be the same as the totals in item 7i and item 9d (column 1). Similarly, the total shown for Federal Government in item 8d (column 2) should be the same as totals in item 7a and in item 9d (column 2).

In item 8a, report direct salaries and wages charged to separately budgeted R&D accounts of your institution. Include costs of benefits only where they can be directly attributed to the costs of separately budgeted research and development; otherwise, include such costs under item 8c, indirect costs reimbursed or reimbursable.

In item 8b, report all expenditures for materials and expendable equipment.

In item 8c, report all indirect (overhead) costs attributable to separately budgeted R&D expenditures which were reimbursed or will be reimbursed by the sponsoring organization. Do not include any indirect costs incurred which *were not* reimbursed and *will not* be reimbursed.

Item 9. Total and federally financed current expenditures for separately budgeted research and development, by type of R&D activity, 1969-70.

Types of R&D activity for which separate data are requested (basic research, applied research, and development) are defined on page 7 of the Instructions. It is recognized that your records may not yield exact figures on amounts expended for each of the three categories. In such cases reasonable estimates of the breakdown will be satisfactory. The totals in item 9d should be the same as those in item 8d.

Item 10. Total and federally financed current expenditures for separately budgeted basic and applied research, by field of science, 1969-70.

In column 1, include all current expenditures for total separately budgeted research, by field of science as shown on pages 7 and 8, whether such expenditures derive from outside sources or your institution's own funds, and whether from contracts, grants, gifts, endowments (income or principal), State and local government appropriations, or other sources, provided the funds were separately budgeted for research and were expended in the fiscal year 1969-70. Also include any indirect costs reimbursed or reimbursable by outside sponsors of research projects. Where it is not possible to identify expenditures for the year, receipts may be substituted.

In column 2, classify total separately budgeted research financed by the Federal Government, by field of science.

Totals in item 10i (columns 1 and 2) should equal the sum of items 9a and 9b (columns 1 and 2).

Section E—Current Expenditures for Instruction and Departmental Research in the Sciences and Engineering

(Expenditures for capital equipment and facilities are to be excluded here but reported in Section F.)

Financial data requested in this section are intended to be consistent with data reported in U.S. Office of Education's Higher Education General Information Survey, *"Financial Statistics of Institutions of Higher Education."* Data requested should be derived from or estimated on the basis of Current-Funds Revenue (Revenue for Education and General Purposes) and Current-Funds Expenditures (Educational and General Expenditures).

Current expenditures for instruction and departmental research include the salaries of department heads, faculty members, secretaries and technicians, office and laboratory supplies, and other expenses. All expenditures incurred for instructional programs in science and engineering subjects for students pursuing degree-credit courses of study which lead generally to a certificate or degree should be included.

Item 11. Current expenditures for instruction and departmental research in the sciences and engineering, by field of science, 1969-70.

Report all current expenditures of the instructional departments, colleges, and schools of the institution in the sciences and engineering, by field of science, as described on pages 7 and 8.

Item 12. Estimate the dollar amount of overhead (or indirect) costs allocable to the instruction and departmental research activities reported above (item 11).

Current expenditures for instruction and departmental research in the sciences and engineering (item 11) represent *direct* expenditures incurred by your institution in carrying out these functions. The purpose of item 12 is to obtain an estimate of the overhead or indirect costs associated with these direct expenditures. Such overhead or indirect costs include an appropriate share of the institution's expenditures for general administration, student services, libraries, and the operation and maintenance of physical plant.

Section F—Capital Expenditures for Scientific and Engineering Facilities and Equipment for Research, Development, and Instruction

This section covers capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction during 1969-70. Report funds expended during 1969-70 for facilities which were in process in that year and for facilities which were completed that year. Expenditures for administration buildings, steam plants, residence halls, and other such facilities should be excluded unless utilized principally for research, development, or instruction in engineering or in the sciences. Land costs should be excluded.

Facilities and equipment expenditures include the following: (a) fixed equipment such as built-in equipment and furnishings (hoods, fixed laboratory tables and benches, and ventilation equipment); (b) movable scientific equipment such as oscilloscopes, pulse-height analyzers, spectrometers, and plasma and protein separators; (c) movable furnishings such as bookcases, desks, file cabinets, tables, and simple tools; (d) architect's fees, site work, extension of utilities, and the building costs of service functions such as integral cafeterias and bookstores of a facility;

and (e) special separate facilities used to house scientific apparatus such as hypersonic tunnels, accelerators, and oceanographic vessels.

Current-fund expenditures for capital equipment and facilities should be reported in this section and should be excluded from Sections D and E. Expenditures from plant and other funds for facilities and equipment should likewise be included in this section.

Item 13. Capital expenditures for scientific and engineering facilities and equipment for research, development, and instruction, by field of science, source of funds, and purpose, 1969-70.

Capital expenditures should be divided into three sections: (1) all purposes, (2) R&D and graduate instruction, and (3) undergraduate instruction. Further, classify such expenditures by broad fields of science, as follows: engineering, physical and environmental, mathematics, life, psychology, social, and other sciences. See the instructions related to item 7 for assistance in distributing capital by source of funds.

Prorate capital expenditures for multipurpose structures. The space utilized for particular functions may be used as a guide in prorating. Thus, if 50 percent of the total square footage of a science building is allocated to R&D and graduate instruction, the remaining 50 percent to undergraduate instruction, then capital expenditures should be distributed accordingly between these two functions. The following guidelines may be helpful in determining the functional usage of space: (1) The term *research and development* (R&D) was previously defined on page 7 of the Instructions. *Graduate instruction* is a course of study offered primarily to students who have attained a first-level degree and is designed to lead to a second-level or doctoral degree in a given field. Included is postdoctoral education which is defined as advanced training beyond the Ph.D. or Sc.D. degree, as well as the training of interns and residents. (2) *Undergraduate instruction* is a course of study designed to lead to the bachelor's or first-professional degree in a given field.

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Other Science Resources Publications

Title	NSF
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1971, 1972, and 1973, Vol. XXI	72-3
An Analysis of Federal R&D Funding by Function, 1963-73	72-3
Scientists, Engineers, and Physicians From Abroad, Trends Through Fiscal Year 1970	72-3
Science Resources Studies Highlights, "Changes in Graduate Programs in Science and Engineering, 1970-72 and 1972-74"	72-3
Research and Development in Industry, 1970	72-3
Science Resources Studies Highlights, "First-Year, Full-Time Graduate Science Enrollment Continues to Decline"	72-3
Unemployment Rates and Employment Characteristics for Scientists and Engineers, 1971	72-3
Science Resources Studies Highlights, "Total Scientific and Technical Personnel in Industry Remains Level, R&D Personnel Lower in 1970"	72-3
Scientific Human Resources: Profiles and Issues	72-3
Papers and Proceedings of a Colloquium on Research and Development and Economic Growth/Productivity.	72-3
Federal Funds for Academic Science, Fiscal Year 1970	72-3
National Patterns of R&D Resources. Funds and Manpower in the United States, 1953-72	72-3
Science Resources Studies Highlights, "Federal Scientific, Technical, and Health Personnel in 1970"	71-4
American Science Manpower, 1970	71-4
Science Resources Studies Highlights, "Enrollment Increase in Science and Mathematics in Public Secondary Schools, 1948-49 to 1969-70"	71-3
1969 & 1980 Science and Engineering Doctorate Supply & Utilization	71-2
Reviews of Data on Science Resources, No. 20, "Trends in Graduate Science and Engineering, 1960-70"	71-1
Science Resources Studies Highlights, "Secondary School Science Teachers (Experience and Employment)"	71-1

es Publications

Title	NSF No.	Price
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1971, 1972, and 1973, Vol. XXI	72-317	
An Analysis of Federal R&D Funding by Function, 1963-73	72-313	$1.75
Scientists, Engineers, and Physicians From Abroad, Trends Through Fiscal Year 1970	72-312	$1.00
Science Resources Studies Highlights, "Changes in Graduate Programs in Science and Engineering, 1970-72 and 1972-74"	72-311	-----
Research and Development in Industry, 1970	72-309	$1.00
Science Resources Studies Highlights, "First-Year, Full-Time Graduate Science Enrollment Continues to Decline"	72-308	-----
Unemployment Rates and Employment Characteristics for Scientists and Engineers, 1971	72-307	$1.75
Science Resources Studies Highlights, "Total Scientific and Technical Personnel in Industry Remains Level, R&D Personnel Lower in 1970"	72-306	-----
Scientific Human Resources: Profiles and Issues	72-304	$0.25
Papers and Proceedings of a Colloquium on Research and Development and Economic Growth/Productivity.	72-303	$0.75
Federal Funds for Academic Science, Fiscal Year 1970	72-301	$0.70
National Patterns of R&D Resources. Funds and Manpower in the United States, 1953-72	72-300	$0.50
Science Resources Studies Highlights, "Federal Scientific, Technical, and Health Personnel in 1970"	71-47	-----
American Science Manpower, 1970	71-45	$2.00
Science Resources Studies Highlights, "Enrollment Increase in Science and Mathematics in Public Secondary Schools, 1948-49 to 1969-70"	71-30	-----
1969 & 1980 Science and Engineering Doctorate Supply & Utilization	71-20	$0.50
Reviews of Data on Science Resources, No. 20, "Trends in Graduate Science and Engineering, 1960-70"	71-15	$0.15
Science Resources Studies Highlights, "Secondary School Science Teachers (Experience and Employment)"	71-12	-----